Printing & Book Crafts for Schools

Frederick Goodyear

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PRINTING & BOOK CRAFTS FOR SCHOOLS

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BY

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TO

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SOMETIME PROFESSOR OF EDUCATION AT THE
UNIVERSITY COLLEGE OF WESSEX, SOUTHAMPTON
TO WHOSE INSPIRATION AND ENTHUSIASM THE AUTHOR IS MORE
INDEBTED THAN HE CAN EXPRESS

FOREWORD

> And thirdly—Books. In which third truly, the last-invented, lies a worth far surpassing that of the two others. Wondrous indeed is the virtue of a true Book. Not like a dead city of stones, yearly crumbling, yearly needing repair; more like a tilled field, but then a spiritual field: like a spiritual tree, let me rather say, it stands from year to year, and from age to age (we have Books that already number some hundred-and-fifty human ages); and yearly comes its new produce of leaves (Commentaries, Deductions, Philosophical, Political Systems; or were it only Sermons, Pamphlets, Journalistic Essays), every one of which is talismanic and thaumaturgic, for it can persuade men. O thou who art able to write a Book, which once in the two centuries or oftener there is a man gifted to do, envy not him whom they name City-builder, and inexpressibly pity him whom they name Conqueror or City-burner! Thou too art a Conqueror and Victor; but of the true sort, namely over the Devil: thou too hast built what will outlast all marble and metal, and be a wonder-bringing City of the Mind, a Temple and Seminary and Prophetic Mount, whereto all kindreds of the Earth will pilgrim. Fool! why journeyest thou wearisomely, in thy antiquarian fervour to gaze on the stone pyramids of Geeza, or the clay ones of Sacchara? These stand there, as I can tell thee, idle and inert, looking over the Desert, foolishly enough, for the last three-thousand years: but canst thou not open thy Hebrew Bible then, or even Luther's Version thereof?
>
> CARLYLE, *Sartor Resartus*, Book II, ch. viii

MY enjoyment in reading Mr Goodyear's book is partly due to the memories which it recalls of days at our Fielden Demonstration School[1] in Manchester, when James Shelley (now Professor of Education in New Zealand) procured a hand printing-press and cases of type, wood for printing designs, and many other of the tools and materials so carefully described here by Mr Goodyear. That experience convinced me that the theory on which we worked was sound—both for children in their teens and for the students who under Mr Shelley's direction repeated the experiences of Gutenberg and Caxton (see p. 33 below). And now Mr Goodyear, after practising and researching over the whole field for many years, both as teacher and craftsman, offers a like opportunity to all teachers.

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[1] *Demonstration School Record*, vol. ii, p. 113 (Manchester University Press, 1912).

And what is this theory ? Briefly put, it is a translation, a sublimation, if you like, of the ancient mystery surrounding the Book, the Written Word graven on stone, on wood, on parchment ; a mystery and a power which accompanies all scholarship and book-learning—a turning this over, I say, into a medium with which the child can work. And by such work, letter-making, page-making, book-making, he frees his mind at the lowly practical level, so that henceforth, without superstition but still with reverence, he can enter the portals of the temple and be ready for the revelation.

If this interpretation be deemed far-fetched and fantastic I am open to correction by the psychologists, busy as they are in these days with the conflicts of childhood and the symbols in which these find expression. Let it be remembered that the education of English children, right back to the days of King Alfred, has meant, to the popular mind, neither more nor less than teaching the child to 'mind his book.' No doubt we who receive the children into our schools have advanced far beyond this primitive conception of educational ends, but it abides as fact, deep in the racial memory of the common people, and renewed in the desires of successive generations as they send their little ones to school. Not, indeed, that this urge is universal : if it had been the world would long ago have been a world of pedants : but, alike in acceptance and in opposition, the ambition to explore the mystery of learning through the medium of letters has stood out as one of the master-impulses at work in human destiny.

And so, amid all the other arts and crafts, the making of letters and of books asserts its claim. The school, to the childish mind, embodies many crafts. It is first of all a building, like the house in which the child dwells : and from these structures he derives his interest in the building trades, the sand and wood, the metal and stone, and the tools which his little hands delight to wield. And when the school-house is built, the domestic arts of the kitchen, the sewing-room, and the rest are transferred from home to school. Again, as Froebel taught us, the school is like a garden, for children grow like plants and need plants and animals about them: thus the crafts of gardener and poultry-woman are added to the list of possible activities. Now this work on *Printing and Book Crafts for Schools* completes the circle; for it displays our school building as a *scriptorium*, a library, a place of books, where loving hands put together, with tools and material all prepared, the 'works' from which the young are seeking wisdom. Once more, does the reader regard this conception of handicrafts and their function as far-fetched? If so I again appeal to the psychologists, the expert students of children's minds: what I here set down is in line with all that they are telling us of the structure of the growing organism, and of its outlook in purpose and achievement during the years when the fancies of infancy are yielding to the practical images of childhood.

All scholars and parents should therefore give a welcome to Mr Goodyear's design: the scholar who treasures the books and pamphlets on his shelves; the father and mother who watch, often with too anxious care, to see that their offspring gain the mastery of letters. Many teachers, I fear, will resist the appeal: handicraft is not their concern, they may say: they treat the crafts as a separate 'subject,' called handicraft teaching—the concern only of specialists.

Now in one sense this plea must be allowed, for no one can 'pick up' a craft in a few hours or weeks, even if he has a book like this to guide his efforts. And yet we may easily carry the cult of specialism too far. If we sincerely believe in 'all-round' education for children we ought to accept the doctrine for ourselves, and be ready to admit the value of a craft which anyone can practise in the leisure of week-ends and holidays for a while, until he gains a mastery adequate at least to guide the first efforts of school children. I hope, therefore, that interest in these book crafts may not be confined to those who are already handicraft teachers by profession: it may serve also as a starting-point for those whose specialism has hitherto been limited to the contents of books, in history, literature, or art. May I, without egotism, add a personal testimony? I was brought up, as child and youth, in a world where, save for the influence of music, the arts and crafts were shut out from conscious interest. In maturer years I was led to attend for two or three weeks the course in *Handfertigkeitsunterricht* conducted by Dr Götze at Leipzig, in the early days of the manual training movement. Ever since then, as opportunity has offered, I have found interest in tools and materials, indoors and out, a *dilettante* and superficial interest, no doubt, but always practical. Now no one can judge, least of all myself, as to how far these interests and activities have helped my mind to more wholesome judgment: but quite emphatically these pursuits have not hindered my intellectual activity. They have not robbed me of time that could otherwise have been spent in study; there has been time for both, and I assert confidently that any teacher who cares to take up a manual art such as this book describes, or any other serious practical craft, will not diminish his energy for purely intellectual output. He may have to forego golf or tennis, but the compensation is adequate.

In conclusion, I would greatly like to see this book examined by the printers and bookbinders. Of course they will be critical, but can I convince them that the extension of such work among English children will immensely promote their cause? For I believe that the conduct of these industries in great machine-shops and factories has not yet destroyed the interest in true craftsmanship. If this had been the effect we should not have witnessed the advances made in popular taste for lettering, poster-display, and kindred arts which have characterized the last twenty years. I want to bring this relation between school-teacher and craftsman into clear relief, for it is seldom fairly faced either by the craft-unions on the one hand or the school-men on the other. It is, by the by, a sign of the times that the Institute of Handicraft Teachers, recently set on foot, represents an effort at harmony between the two, uniting as it does many teachers who spent their youth serving their time in the shops side by side with school-teachers, like the author of this book, who have acquired their skill in the course of a lifetime devoted at the same time to the instruction of children and to the practice of crafts.

All true craftsmen desire a public which appreciates and honours their work, a public which shares their outlook, although it cannot emulate their example: and if they reflect upon the history of England and of Western Europe they will realize that the popular interest in fine workmanship decayed when a civilization arose which cut the children adrift from contact with the work of the local craftsmen, the joiners, the wheelwrights, the blacksmiths, and the rest, who in former days worked among their neighbours in our villages and small towns. This contact, necessary if the rising generation is to revive the capacity and taste for arts and crafts, can only be recaptured if the school and its teachers take their part. As I write these words, awkwardly enough with a pen and a right hand which never acquired the cunning and the grace of a true man of letters, I think of the compositor who will transfer these letters to type, a member of his 'chapel,' wholly divorced from the ancient tradition which led the child to copy the ways and works of his elders in workshop and in field. This disharmony, this conflict between the teacher, with his reforming ideas about education, and the workman, with his type and press, perpetually reshaping the machinery by which the Book is spread abroad, must somehow be bridged. And the first step toward co-operation is a better understanding of the facts—facts of history, facts of power and motive in psychology. The craftsmen and machinists, whether typefounders at Sheffield, or printers in Edinburgh and London City, or artists like Professor Johnston at the Royal College, all the varied groups of workers who deal with the newspapers and the Book are needed by us who teach children. And we teachers in our turn need the help of these workers if we are to interpret wisely the craft-impulses, the crude creative efforts of our children. The teacher who scorns the skill and labour of the tradesman is ignorant of his own job, for the child whom he instructs is a labourer too. And the craftsman who, whether in jealousy or pride, stands aloof from the handicraft teacher is equally at fault, for "the child is father of the man."

J. J. FINDLAY

University of Manchester
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He has found the following periodicals helpful: *The British and Colonial Printer and Stationer* (published fortnightly); *The British Printer* (published alternate months); *The Printing World* (monthly, London); *The Caslon Circular* (monthly, Messrs H. W. Caslon and Co., Ltd., 82–83 Chiswell Street, London, E.C.1); *The Printing Art* (monthly, University Press, Cambridge, Massachusetts, U.S.A.); *The Inland Printer* (monthly, Chicago); *The American Printer* (monthly, New York); *Commercial Art* (monthly, London).

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PRINTING & BOOK CRAFTS FOR SCHOOLS

CHAPTER I

Introductory

THE author, a teacher and not a trade printer, is conscious of the shortcomings of this book, and would point out that it is not in any sense a text-book on the art of printing ; but, as its title implies, an effort to reduce the practice of that art to the simplest possible terms.

Its purpose is to introduce to the schools a craft which will be found to be well within the capacity of both boys and girls. The scheme of work outlined on p. 201 is the result of some few years of experiment with children from eight years of age upward, working under ordinary school conditions and without special equipment.

The apparatus described, with but little exception, can be made in a class-room by boys with an elementary knowledge of tool processes. Simplicity of construction has been the governing factor in design, and as few, if any, schools nowadays are without access to a woodwork room, the few accessories which might prove a difficulty elsewhere can be constructed.

It will be obvious that metal type cannot be made except with elaborate appliances, and therefore will have to be purchased. Large initial letters, however, will be cut by hand, and the making of these forms a part of the scheme.

The allied crafts—stencilling, block-cutting, manuscript-writing, and bookbinding—are so intimately related to printing that they demand inclusion in the scope of the work. Although each is a craft in itself, and justifies wider treatment than can be given here, the author has endeavoured to treat of them within the narrowest limits consistent with their importance.

For those who wish to pursue further these several crafts, a list of standard works is included, and the writer acknowledges his great indebtedness to their authors for much valuable help and inspiration.

For teacher and scholar the processes described will be found fascinating in the extreme. The handling of the type; the conversion of writing into print, and the reproduction of it without limit; the cutting of 'pictures'; the transformation of an uninspiring class-room into a 'real printing works' are all joyous occupations which grip the imagination of the children and retain their interest.

Such work brings about a direct contact between the child and mechanical processes with which he will be all the better for being familiar. It stimulates his interest in every kind of printed matter, and turns the hoardings, 'the poor man's picture-gallery,' into a fount of study, pleasure, and inspiration.

It is probable that the pupil's early work will be primitive in character, but that will not destroy its value. While men still prefer the rude propulsion of the sailing-boat and the rowing-boat to more luxurious transport there will always be a place for the primitive in life. Art to-day is not dissociated from the antique, and many of our greatest artists are not afraid to express themselves in the comparative crudity of the woodcut—the earliest method of reproduction.

We need not, therefore, be too exacting in the earlier stages.

Practice will bring confidence: perfection of result will arrive when the pupil has realized that inherent quality of all good craftsmanship, the subordination of the design to the medium of expression.

The most valuable application of the scheme is reached when the pupil writes his prose or poetry unaided; designs and cuts the ornaments and illustrations; sets up the matter in type and on the press; and carries the task through to completion in printing. It is then that he fully grasps the joy to be found in a piece of real creative work.

Mistakes will arise and words will be misspelt, but this, with young children, adds a quality of unexpectedness which is not without charm. With older children it impresses upon them the warning to " be more careful next time," and gives a forceful lesson in accuracy.

An eminent educationist once remarked, after viewing a school handwork exhibition, that it contained only two genuine examples of children's unaided work, and those were two mistakes in spelling!

The attitude of the teacher will be that of counsellor rather than instructor. The desire to interfere must be inhibited so that the results may truly reflect the child mind. But this does not absolve him from responsibility. There will be much for him or her to do as friendly critic and adviser, otherwise the children will attempt work beyond their talent and beyond the scope of the medium.

Simplicity, and again simplicity, must be the keynote. Elaborate designs may be laboured to the point of fatigue and disappointment. Suggestion is much more charming than highly wrought technique.

As a form of educational handwork printing and its allied crafts are unsurpassed, and they offer a correlation which is perhaps unusual—the connexion of handwork with literature and art. They also provide for æsthetic appreciation in bringing to the child some experience of an occupation in which great artists, engineers, and chemists have been pleased to labour.

Printed matter is too familiar to secure our respect, and it is well that children should experience the corrective effect of some knowledge of its processes. It is the lack of this little knowledge which causes us to dismiss as commonplace that which is actually the marvellous. The printed page has rarely any interest for us other than that contained in the subject-matter of the text. But to those who do understand it printing can furnish almost as much pleasure as is given to a connoisseur by an etching, a drypoint, or a mezzotint. That which to the ignorant is but ' a picture ' is to him a thrilling adventure in metal, an entrancing study in the power of the line and the relation and balance of mass, or the capture of an emotion and its imprisonment in a plate of copper.

Leonardo da Vinci, one of the great " Holy Trinity in art," considered it worth his effort to design an alphabet, which, for beauty of proportion, has probably never been surpassed (Figs. 48 and 49). " The grandeur that was Rome " bequeathed to us the exquisite lettering on the Trajan monument with the souls of her sculptors made manifest in every line of it. It is to these that typefounders have returned for our most beautiful modern type-faces.

This scheme of work is a modest attempt to bring to our children an appreciation of letters, to help them to a pleasure which is permanent, and therewith to a delight in other things as yet unlearned.

Once the children are interested in the arrangement of letters on paper they spontaneously collect examples of good printing, and the writer has often been inundated with collections of cuttings which have captured the attention of the pupils. The printed page becomes a reality to the child, particularly if he has assembled his own poetry or prose letter by letter, has secured the type in the chase and inked and printed the page himself ; for these labours open up a new vista. His work has attained immortality ! It has been printed—a great compliment. Even an adult must own to the thrill he felt on seeing his work in print for the first time. To this the child adds a legitimate pride of craftsmanship.

His writing is now a part of a book—a real book such as one buys in the shops—and he and his classmates printed it ! The writing has become a secondary matter ; that was easy—we are always doing that ; but to print it—that is an achievement indeed !

CHAPTER II

A Brief History of Printing

THE introduction of letterpress printing is usually credited to Germany and the Low Countries in the early fifteenth century, but it was probably practised elsewhere before that time. It is certain that many years before this metal stamps were used on documents, and some manuscripts of the twelfth century are so uniform in their characters as to suggest that these were impressed from dies. The Chinese are known to have used movable types, of clay, in the middle of the eleventh century, and impressions from tablets cut on wood in A.D. 175 are ascribed to them. Copper types were used by the Koreans in the fifteenth century, and were probably invented by them.

The earliest dated print is the Mary woodcut now in the Brussels Royal Library. It is inscribed 1418, but there is some doubt as to the accuracy of this date, and the honour is usually given to the Buxheim St Christopher of 1423, now in the Rylands Library at Manchester (Fig. 1).

This is a woodcut, executed with a knife 'on the plank' or surface of a board, and the impression was probably taken by hand-rubbing. Despite the childlike disproportion of the figures this print shows surprising technique at so early a stage, and it sets a standard of excellence which is unusual at the beginning of a craft.

Later prints were taken by squeezing the paper against the inked block, and colours were washed in or stencilled.

The text accompanying the illustration was also cut on the same slab, and it is possible that the use of movable types was the result of detaching these letters into separate blocks.

The setting up of the text with single letters followed a score or so of years later—at any rate before 1450—and this method was first used by Johann Gensfleisch (or Gutenberg).

Reputable authorities contend that he was anticipated by Laurens Coster of Haarlem.

In these days the letters were cut on wood or soft metal by the printer himself, and considerable time elapsed before typefounding, or casting the letters in moulds, sprang up as a distinct craft.

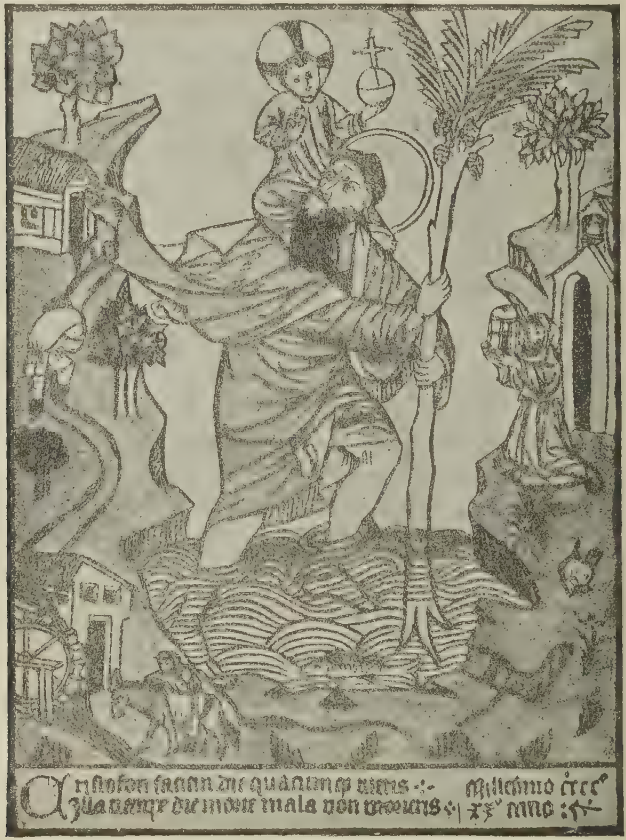


Fig. 1. The Buxheim St Christopher

To Gutenberg we owe the earliest dated documents—two indulgences printed in 1454—and he also printed the famous forty-two-line Bible of 1456.

The art spread very rapidly, and fifty German towns possessed printing-presses before the end of the century. Some three thousand books from these presses are in the British Museum.

Caxton, who had learned printing at Bruges, introduced it into England in 1476, and before his death in 1491 had printed over one hundred books.

A few books were printed about this time by an unknown schoolmaster at St Albans. Printing which was superior to that practised on the Continent began in this country with the improved types of William Caslon (1692–1776). He was commissioned by the Society for Promoting Christian Knowledge to cut punches for an Arabic 'fount,' and, by instituting the typefounding business of Caslon and Co., quickly established supremacy over foreign competition.

The earliest note concerning typefounding in England is contained in the *Chronicles of King Alfred.* It states that the printer, John Day, was the first to cast Saxon types.

Baskerville (1706–75) was responsible for types in which the thick and thin strokes were accentuated.

Until the middle of the eighteenth century printing-presses were made of wood, a stout screw being used to give pressure. We owe the first iron press to Earl Stanhope, who still retained the screw, but added several improvements. This press was followed by others with varying additions, notably the Albion (English) and Columbia (U.S.A.). Many of these are still in use. In their design the screw is supplanted by the toggle and lever, giving quicker pressure and release. The printed surface is much larger, and these presses can accommodate a sheet of double crown, 30 in. by 20 in. The approximate output is 250 copies per hour with two men.

Frederick König (1774–1833), a German working in England, devised the first 'machine' whereby the pressure was obtained by running the forme of type under a cylinder. In the later 'rotary' machines both the type and pressure surfaces are made to revolve. König's machine printed only one side of the paper. 'Perfecting' machines print both sides in one operation.

In 1848 Augustus Applegath designed a machine for *The Times* wherein the ' cylinder ' of type was vertical. It was not circular, but polygonal, each face of the prism being a column of the page. The output was 8000 copies per hour.

Robert Hoe's (U.S.A.) machine succeeded Applegath's. Here the type was ingeniously fastened to a horizontal cylinder which, revolving at a high speed, produced 20,000 sheets, printed one side, in an hour.

William Bullock introduced the circular stereo, or casting from the type, in 1865, and this recorded a great advance in machine-work. In this method, used for modern newspaper work, or where a large quantity is required, a thick sheet of *papier mâché* is pressed on to the type. This ' flong,' the impression of the type, is dried by heat, and, as it is an exact reverse of the type, the letters being depressed, it is placed in a casting-box, either flat or curved to the shape of the cylinders, and stereo metal, rather softer than type metal, is poured in. The resulting casting is then trimmed and secured to the printing cylinders. If cast in the flat, separate sections are sometimes sawn apart and mounted on blocks to type height.

Hand-press work is still produced, notably at the Vale Press and the Dove Press, but is used only for the finest and most expensive work. William Morris's Kelmscott Press was renowned for beautiful productions.

There are, roughly, three methods of printing : (*a*) relief, as in letterpress, (*b*) planographic, where the whole surface may be flat, but with only certain portions susceptible to the ink, as in lithography, and (*c*) intaglio, in which the printing portion is cut below the surface, which is inked, and then wiped clean, leaving the ink in the depressions. The paper is forced into these depressions, from which it picks up the ink.

Some modern processes are combinations or variations of these, photography entering largely into the method.

Music is sometimes set up in type and printed as letterpress, but the best editions are engraved on metal, the lines being ruled and the notes punched with steel punches. A transfer is taken from this plate, put on stone, zinc, or aluminium, and printed lithographically.

CHAPTER III

The Printing-press

The Problem of the School Press

THERE are, possibly, a few schools where the purchase of printing machinery and materials will not prove a difficulty, but in the majority such expenditure will be impossible. The high cost, the problems of storage and space, are, generally speaking, almost insuperable, and it is for such schools that this book is written. It will be necessary, therefore, to consider how it may be possible to print with the minimum of expense.

Printing without a Press

Printing can be done without a press, and indeed was so done formerly in some newspaper offices, where 'galley proofs' were 'pulled' to allow the proof-reader to check the matter, by the simple expedient of bringing the paper into contact with the assembled inked type by an indiarubber-covered roller.

We may do the same in school.

The type is set up and locked in the chase (see Chapter V). The paper to be printed is slightly damped, placed carefully on to the surface of the type, and a photographer's 'squeegee' roller is passed over the back of the paper.

The quality of the printing will not rank with the masterpieces of the typographer's art, but it will be legible. After the process the back of the paper may approximate to the surface of a nutmeg-grater, and if that side is to be printed also it must be ironed out.

Or we may use the method followed at the Wyche School—a primary school at Malvern, where that clever little magazine *The Young Wyche* is produced with apparatus perhaps even more primitive (Fig. 2).

The type is secured in a shallow box having set-screws through the sides, and a handle of leather underneath. The inking is done with a roller made from a piece of broomstick covered with cycle tubing. The paper is placed on a piece of cloth or felt, and the inked type is pressed on the paper by hand. Crude as the process may seem, it represents in essence the mechanism of the modern hand-press.

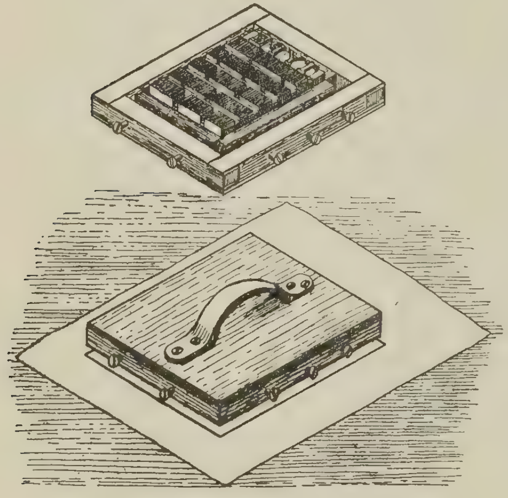


Fig. 2. Printing "The Young Wyche"

Printing by Hand-rubbing

The earliest known examples of printing were produced by rubbing the back of the paper with a suitable 'scrubber' applied by hand. The exquisite Japanese wood-block prints are still produced by this method (see Chapter IX).

To take an impression from metal type it is obvious that the paper must be held firmly while scrubbing, or nothing but a smudge will result.

A double frame is necessary (Fig. 3), across the bottom of which is screwed a sheet of 3-ply wood or similar material. The lower frame requires to be about 10 in. by 9 in. (outside measurements), and is made of planed wood, 1 in. to 1½ in. in width, and of a thickness exactly the same as the height of type, which is $\frac{11}{12}$ in. The upper frame is of the same dimensions, but the material is ½ in. in thickness.

Across the face of this is stretched a sheet of vellum, parchment, or stout paper: if the latter, use the kind faced with linen. To secure a tight, drum-like surface paste or glue the sheet in position after it has been damped with a sponge.

Scrubbers. These can be made from a block of cork round which has been glued a piece of hard canvas of medium grain, or a block of wood faced with canvas, as shown in Fig. 4. A disk of thick sole-leather which has been scored on the face with a few V-grooves, cut with a sharp penknife, makes an excellent tool. Sew a leather handle to the disk, allowing just sufficient space for the fingers to pass under. The knuckles will bear on the back of the leather, and the strap should then be tight.

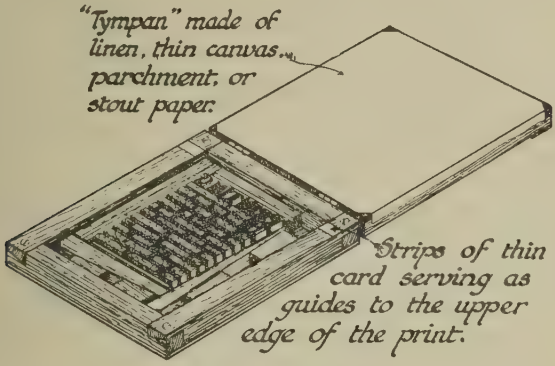

"Tympan" made of linen, thin canvas, parchment, or stout paper.
Strips of thin card serving as guides to the upper edge of the print.

Fig. 3. The Frame

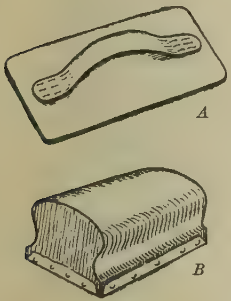


Fig. 4
A, Leather Scrubber; *B*, Block with Canvas Face

Inking. This may be done with a roller, or in the true Caxtonian manner by dabbing the ink on the type with a 'ball' (Fig. 5). These are made from old kid gloves. Remove any fancy stitches from the back, and insert a tight wad of cotton waste or cotton wool into the palm. Gather the fingers and wrist together over the palm, and tie securely with string to form a handle. Sew a few strands through this handle to prevent the binding from working upward, so leaving the ball slack.

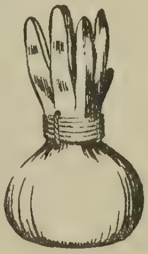


Fig. 5
Ink Ball

Spread a small quantity of ink on a slate, or sheet of glass, by working it with the ball until a film is evenly distributed. Ink the type by tapping the ball over all the surface.

Two small pieces of gummed paper or thin card are stuck on the frame as shown in Fig. 3.

The upper edge of the paper to be printed is brought into line with these and allowed to fall on to the type; the upper frame is folded over, and the scrubber used with a few vigorous strokes.

Open the frame, and carefully take out the printed paper, lifting it clear of the type. The rubber roller may be substituted for the scrubber.

The quality of the printing will be much affected by the nature of the paper. A hard or glazed surface is not usually satisfactory. The paper should be fairly soft, a common foolscap being quite good; but the best results, when printing by hand-pressure, are obtained with a semi-absorbent paper, such as typewriting duplicating paper.

Whichever paper is used a better result will be obtained if the paper is damped slightly beforehand (see Chapter IX).

Caxton's Press

By this time the reader will, no doubt, have thought of the use of the screw-press. That, indeed, was the method used by Caxton and his contemporaries in the first printing-presses, but there are many objections to its use in schools.

A screw of the right pitch—*i.e.*, one giving a quick thrust and release—would have to be cut specially. The ordinary stock wooden screw, as used in a carpenter's vice, is slow in operation, and to make a school press with one of these would entail bulky apparatus without any appreciable advantage over simpler and less cumbrous designs.

An excellent substitute, the iron office letter-press (Fig. 7), can often be obtained cheaply, and this can be adapted for printing purposes quite effectively.

The upper plate will be found to be slightly irregular, or at any rate the surface will not be sufficiently plane to print evenly. Further, contact between the iron plate and the type, with only a piece of thin paper between, is likely to damage the type.

Strawboard or smooth cardboard must be interposed.

The double frame (Fig. 6) will be used, with the addition of a smoothed piece of hardwood fitting loosely into the upper frame. This piece is a little thicker than the depth of the sides, so that it may take the pressure.

Simple brass clips, as shown in Fig. 6, will hold it in place.

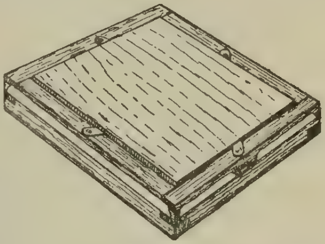


Fig. 6. Frame ready for Press

The type is inked as before, the paper placed in position, and the upper frame folded over. A piece of cardboard is dropped into the upper frame, the hardwood piece is placed on it, and the whole is slid into position under the screw of the press, the pressure being applied gently. Care must be taken that the screw is not tightened unduly, or the type-face may be damaged. A few trial prints will establish the correct pressure. This must come centrally on the type-face, and a little adjustment and a few spoiled prints will be made before satisfactory results are obtained.

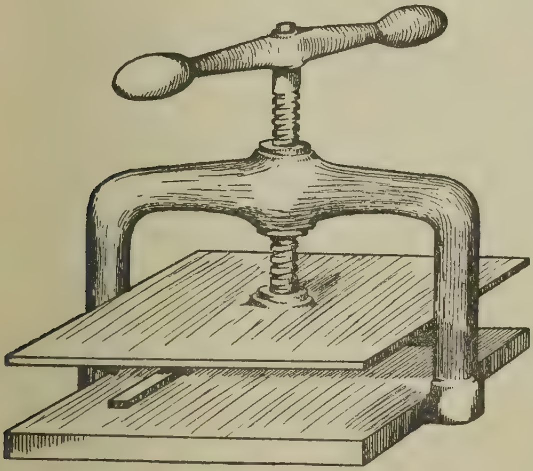


Fig. 7. Letter-press, showing Guides in Position

To ensure the correct placing of the frame at each printing, lay two pieces of wood along one side and one end of the frame as each trial print is taken. When a satisfactory proof has been pulled the position of these sticks can be marked with pencil and they can then be secured by seccotine or similar adhesive substance (Fig. 7). The frame will always be correctly placed if it is in contact with these guides.

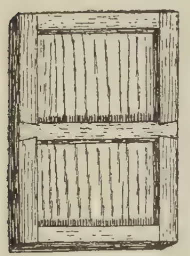


Fig. 8. Double Frame

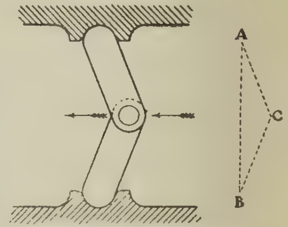


Fig. 9. The Toggle

As the problem of pressure is easily solved with such a press it is possible to print a fairly large area of type, or two smaller portions, such as a double page of a magazine. In the latter case it will be best to make a double frame (Fig. 8), with a central bar the ends of which are dovetailed into the sides.

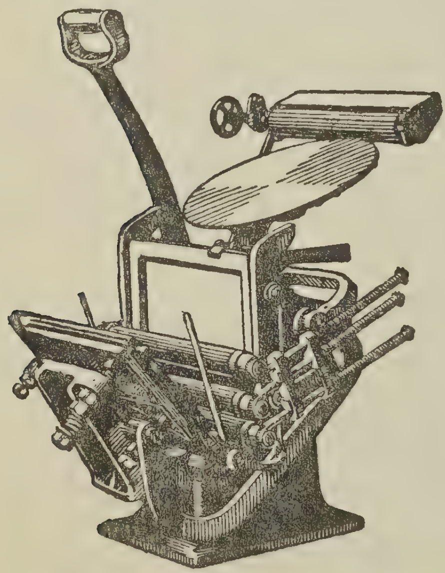


Fig. 10. The "Premier" Hand-press

Modern Hand-presses

The modern hand-press does not depend upon the screw for the thrust, but upon a later invention, the toggle, which is actuated by a lever (Fig. 9).

Points *A*, *B*, and *C* represent the angles of a triangle, two sides of which, *AC* and *BC*, are together greater than the third, *AB*.

Pressure (by a lever) is applied at *C*, this point being driven inward until *AC* and *BC* are vertical and occupy the line *AB*. Obviously the distance *AB* is extended, and this extension gives the required pressure.

The advantage of the toggle is the speed of thrust and release, the disadvantage being in the shortness of the thrust.

In all presses it is necessary to have easy access to the type for inking. In the "Albion" press and those of similar design the forme of type lies on a sliding bed which is run out for inking and placing of the paper. Many of these presses are in use to-day, being used for pulling proofs. A few private presses still use them for exclusive editions, and William Morris's beautiful books were produced on these machines.

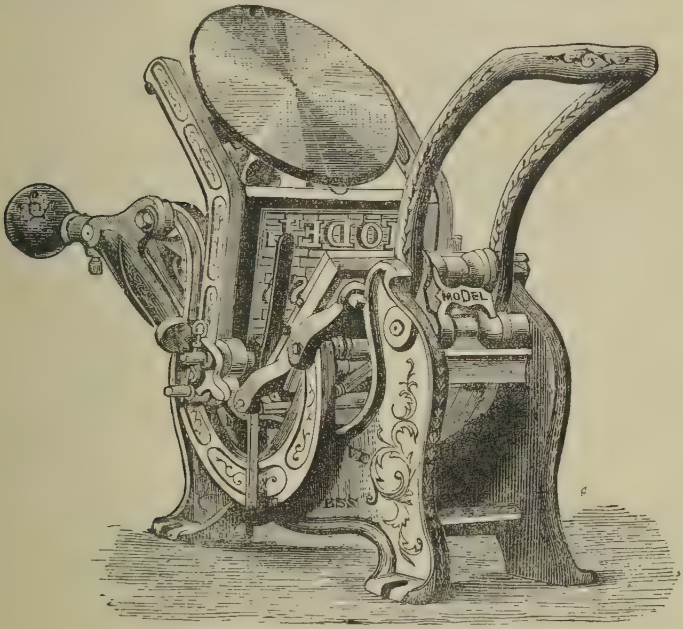


Fig. 10A. THE "MODEL" HAND-PRESS

There is another design of press which does not need mechanical power, the smaller sizes being operated by a hand-lever, the larger by a foot-treadle. Excellent examples are represented by the "Premier" (Fig. 10) and the "Model" (Fig. 10A) (Excelsior Printers' Supply Co., Ltd., 41 Farringdon Street, London, E.C.4), and the "Pilot" (Fig. 11) and "Peerless" (Fig. 11A) (H. W. Caslon and Co., Ltd., 82–83 Chiswell Street, London, E.C.1).

In these presses the forme is held vertically, and the platen carrying the paper is pulled against it by connecting rods, which are actuated by eccentric cams geared to the drive, or by an arrangement of toggles. The platen falls back after each impression, allowing the printed sheet to be taken out and replaced by a blank one. Automatic inking is effected between each impression by rollers passing over the revolving distributing plate and thence over the type-surface. An ink duct or box serves the ink as is required. Such a machine is very speedy, and an average output is 1000 sheets an hour with one operator, but the initial cost places it beyond the reach of many schools.

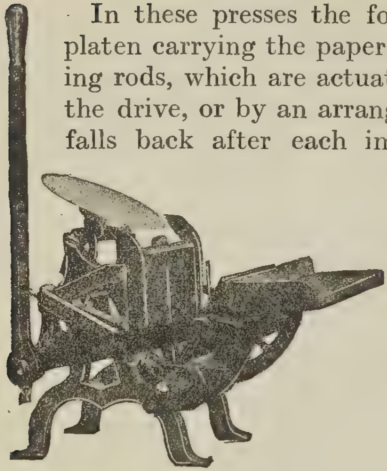


Fig. 11. The "Pilot" Hand-press

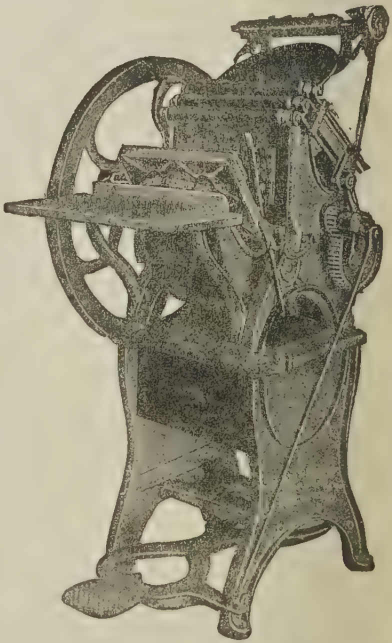


Fig. 11a. The "Peerless" Press

Small hand machines are frequently offered at prices ranging from about £5. They are quick in operation, but the smaller sizes will accommodate only a small forme, printing about 4 in. by 3 in. or even less, and thus the scope may not be so great as in the wooden school-made presses described in the next chapter.

Good second-hand presses of a size suitable for schools are often advertised in the columns of *The Bazaar.*

CHAPTER IV

The School Press—General Equipment

A Simple Lever Press

THE press shown in Figs. 12 and 13 and Plate I follows a design which, simple as it seems, has been reached only after many experiments. The greatest difficulty in making a press is to ensure that the pressure is applied centrally. In addition the thrust and release should be as speedy as possible. Several presses were tried in which the pressure was applied at the end of the platen, but in each case the tendency was to print heavily at one end of the type-face, and this fault increased with use. Again, the design must be simple enough to be within the capacity of pupils with but little knowledge of woodwork.

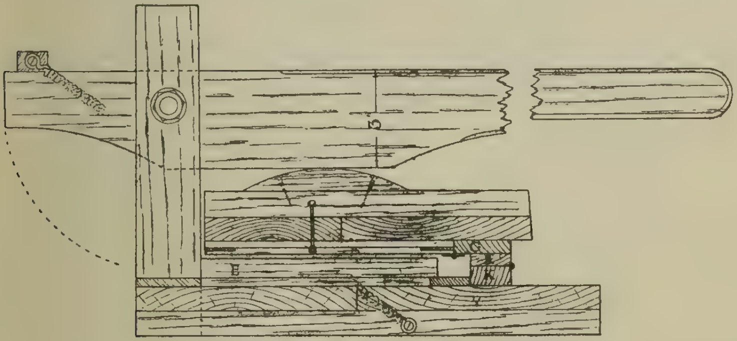


Fig. 12. Elevation of the Lever Press

The press shown illustrates an attempt to meet these difficulties, and it is capable of efficient work on a type-area of approximately 4½ in. by 3½ in. It will be noticed that there are only two real joints in the whole press—viz., those where the uprights are dovetailed into the base. These cannot be avoided, and if the task is too difficult for the pupils it should be done by an adult. Should the joints be faulty, iron right-angle brackets can be screwed to the uprights and the base.

The construction of the press begins with the base, which is made of two thicknesses of board with the respective grain opposed. If of hardwood the boards need be only ½ in. thick; if of soft wood about ¾ in. The upper board will need to be made of two widths to make up to the length of the lower board. The slabs are planed true and glued together as described on p. 44. Similar boards of the same width, but shorter in length, are prepared in the same way for the platen back. When the glue is set the base is cleaned off, and the

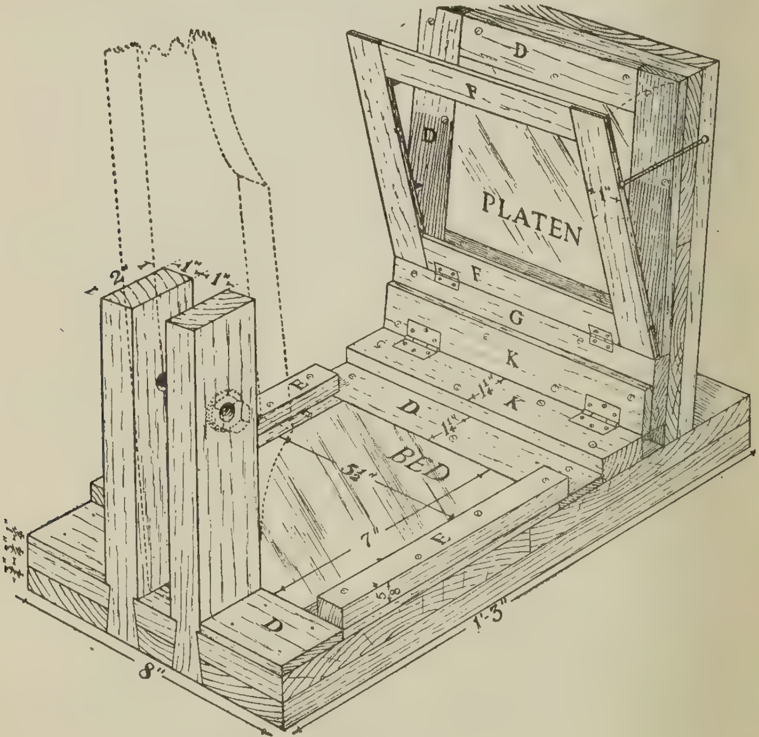


Fig. 13. The Lever Press

uprights fitted and glued. Great accuracy is not called for here, but the posts should be approximately upright and parallel.

The bed and the platen are the next consideration. These must be absolutely plane surfaces, and any material which will give such a surface can be used. It has been found that ordinary school slates, as thick as possible, are quite suitable, and the problem of making them ‘ dead true ’ is an interesting task. Three pieces of slate are obtained and secured to flat boards, such as built-up drawing boards, by a few small brads tacked round the edges, the heads being below the surface. One of the boards being placed on a bench or table, sprinkle a small quantity of very fine sand and a little water on the surface.

Another of the slates is placed on the top, and the two are rubbed together, the motion being as varied in direction as possible. The sand quickly cuts into the surfaces, and more water will need to be added, both to act as a lubricant and to help to wash away the powdered slate.

Wipe the slates clean, and it will be seen by the scoring whether the two surfaces have been wholly in contact.

If the grinding has been insufficient add fresh sand and water, and repeat the process, but when the slates are apparently bedded to each other use only water and a little of the exuded paste.

Grind again, and use more water until the paste has been washed out and the slates adhere to each other. The surfaces will be found to be quite smooth and probably quite plane if tested with a steel straightedge. It is possible, however, to produce two surfaces which fit each other perfectly yet one is convex and the other concave. Such operations are common in the making of optical lenses.

The supreme test is with the third slate. Each of the prepared slates should be fitted by grinding to this one, for when three surfaces are prepared so that each will fit true to both of the others then each separate surface must be true in itself.

As an alternative plate-glass may be used. The surface will need no preparation whatever, as it has been ground and polished, so that it is perfectly plane. The pieces can be obtained cut to size from glass merchants, who will have scrap pieces in stock. Plate-glass is made in various thicknesses, but the normal thickness is about ¼ in.

If slate is to be used the back should be well scored with a nail or similar instrument to provide a ‘ key ’ for the cement. Several compositions for this adhesive have been tried and found satisfactory. White lead, red lead oxide paint, and gold size and whiting are all suitable, the last composition being the best. The gold size should be thinned by adding a little turps, and the whiting is worked into it after being well powdered. The mixture should have the consistency of thick cream. Spread the cement evenly on the board, and press the slate or glass down to squeeze out all but a thin layer.

Plate-glass will stand considerable pressure, but slate must be handled with care or it will be pressed out of the true.

A few days must be allowed to elapse for the cement to set firmly. The surplus may then be cleaned away and the marginal pieces, *D*, *D*, screwed close to the edges. They should be fitted so that the surfaces are flush with the bed and platen respectively.

The frisket, *F*, and its bearer, *G*, are made next, and fixed to the back of the platen. The former is a rectangular frame ¼ in. thick, and the bearer is made 1/16 in. thicker than the platen, plus the frisket. This will allow the frisket to lie flat on the platen when the paper packing is in position during printing. The frisket is pulled to the platen by two rubber bands passing over two small nails in the edge of the platen and the frisket.

The hinge-bearers, *K*, *K*, are next prepared and fitted carefully so that the platen and bed fall parallel when the type is on the bed. This is described on p. 46.

It will be noticed that no length is indicated for the lever. It will be made as long as is convenient, with a minimum length of about 2 ft. from the bolt. A ½- or a ¼-in. bolt (with a nut and washers) will be strong enough, and the hole for this should be bored so that it passes through the lever at a point above its centre line. When the lever is horizontal it rests on the pressure block which is just a piece of hardwood screwed to the back of the platen.

To assist the lever to return after the impression a cross-piece can be fastened to the short end, and to this piece are fastened a couple of rubber door-pulls or coiled steel springs. The length of the cross-piece will be 8 in.—the same as the width of the bed. If the cross-piece is not added, the heel of the lever should be cut away a little so that it goes back past the vertical position.

The two side-pieces, *E*, *E*, serve for the purpose of wedging the chase in position.

A Toggle Press

The larger press described below and shown in Plate II will be found much more efficient and speedy in use than the simpler press just described. The construction is more elaborate, but it will present no difficulties to a group of boys possessing some skill with woodworking tools.

The lower frame will be the first consideration. This, seen in Fig. 14, is made from deal or similar timber, planed to 2¼ in. by 1¼ in., and supported on two cross-battens at the ends.

The cross-bearers, *B*, *B*, should be morticed and tenoned together and wedged at the time of glueing. Halved joints can be used if they are well fitted.

Mark out the two long pieces, *A*, *A*, ‘in pair,’ and then the two cross-bearers similarly.

The centre-bearer, *C*, will be marked from the long pieces, deducting the thickness of the cross-pieces when squaring the shoulders.

It will be best to set out and bore the bolt-holes before glueing up. The boring needs to be done with care, or there will be a difficulty in getting the bolt through. Use a marking-gauge to give the centres of the holes, and bore each piece separately to minimize the risk of deviation of the bit. An auger-bit is a necessity if the hole is to be clean and straight.

Test the bit on a spare piece of wood to see if the bolt fits the hole before boring the framing.

It will be noticed that the underbed and the platen backing are of the same construction and size, and therefore they may be made at the same time. They are made by glueing together two pieces of ½-in. board cut to 8½ in. square, or a little more to allow for trimming. Hardwood is preferable to soft wood. Notice that the grain in the two pieces is opposed, to counteract any tendency to warping.

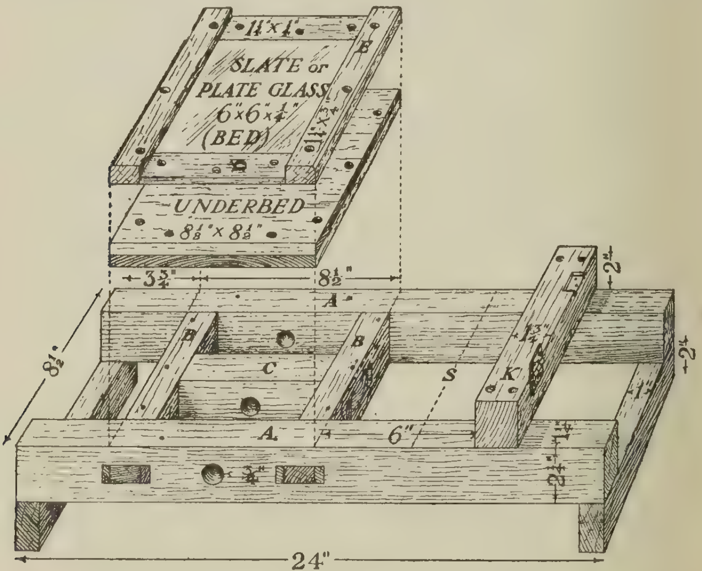


Fig. 14. Lower Half of Press

The boards should be planed true, and then the surfaces to be glued are well scratched with a saw-blade to make a key for the glue. The boards are warmed a little, good hot Scotch glue is spread on each, and the two boards rubbed together to squeeze out as much glue as possible and placed under even pressure for at least twelve hours. When dry and cleaned off the underbed is screwed to the frame.

The slate or plate-glass bed and platen are now cemented to their respective backings, care being taken to squeeze out as much of the cement as possible and to avoid air-pockets underneath. Allow the cement to set before fixing the margins *D*, *D*. These are made to finish flush with the surface of the glass or slate. Two of the margins *E*, *E*, on the bed are ¾ in. thick to allow of the chase being wedged against them during printing. Thicker material than ¼ in. may be used for the bed and platen, but if this is done the spindle-holes in the toggle-arms will need to be raised proportionately.

The runners, *F*, *F* (Fig. 15), at the back of the platen should now be screwed on, and the frisket and hinge-bearers, *G*, *G*, made and fixed. The combined thicknesses of the hinge-bearers are equal to the thickness of the platen and backing, plus a fraction of an inch to allow for 'make-ready' on the platen.

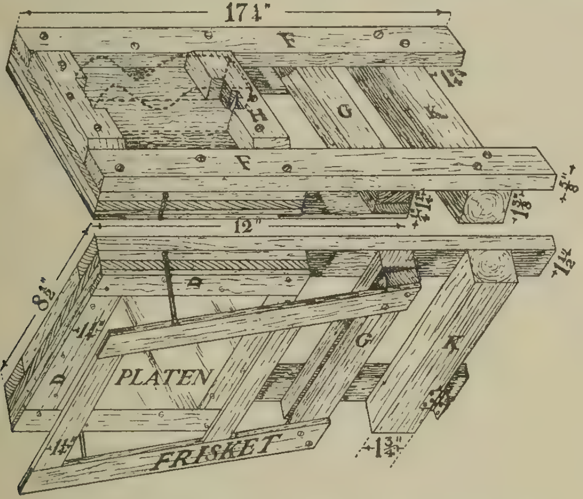


Fig. 15. Two Views of Upper Portion of Press

Rubber bands are used to pull the frisket to the platen. Small nails with flat heads secure these to the platen-back and edge of the frisket.

The large hinge-bearers, *K*, *K*, which secure the platen to the bed are now prepared. Considerable care must be taken in making them to the correct thickness, or the platen will not fall flat on the type when printing. They are marked on the respective drawings as 1⅜ in. and 2 in., but this cannot be taken as the exact size required. The surest method is to place a forme of type on the bed with three pieces of foolscap on the surface of the type. If no type is available an electro, or some similar solid of type-height, may be borrowed from a printer, or a block of wood of correct height will serve. Place the platen, with runners attached, on to the type as it would be in the finished press, and put a weight on top to hold it secure.

Between the projecting runners, *F*, *F*, and the bed runners, *A*, *A*, the two pieces *K*, *K* are fitted so that together they will just slide in.

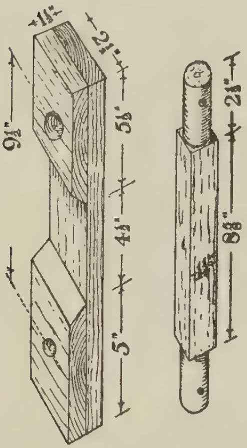


Fig. 16. Toggle-arm and Spindle

Two methods of fixing the hinges are shown (Fig. 14). The slotted method, by which a carpenter hangs a door, is the better.

The open method is, of course, much easier. Use good brass or iron butt-hinges in any case, as they must have no ‘play’ or trouble with the printing will result.

The two toggle-arms (Fig. 16) should next be made. They are quite simple in design. Notice the direction of the grain on the cross-pieces. These should be well glued, as described above, to the uprights. Screws may be added if thought necessary, although the writer has always found the glued joint sufficient.

The holes for the bolt and spindle must be bored with care so that they are at right angles through the material.

The spindle (Fig. 16) is the only piece in the press which must be made of hardwood. Ash, hickory, American elm, and birch have all been tried and found suitable.

A spindle in one of the writer's earlier presses was made of two pieces of elm glued together. The press has been in constant use, yet the spindle shows no signs of failure and very little wear.

The spindle is shown to be 1¼ in. in diameter in the centre and rounded to as large a size as possible at the ends. It can, with advantage, be made 1½ in. thick. It is best to work the rounded end to a trial hole in spare wood cut with the bit to be used. If a centre-bit is used it can be filed (within limits) to cut a hole of the correct size. A Clarke's "Expansion" bit is the best tool for the purpose.

The ends may be turned in a lathe if one is available, but they can easily be produced by making the wood octagonal and then rounding with a file and sandpaper.

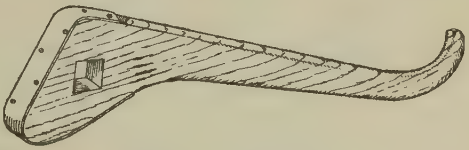


Fig. 17. The Lever

The two small holes through the spindle-ends are best bored when the press is practically finished. They are $\frac{1}{4}$ in. in diameter, and serve to hold two hardwood spigots, or pegs, which keep the toggle-arms against the spindle-shoulders.

The lever (Figs. 17 and 18) may be made of hardwood, but this is not imperative. In the earlier press previously referred to as having an elm spindle the lever was made of basswood.

Reference to Fig. 18 will show the setting out on the board, which is represented by the dotted outline. A board 7 in. wide is indicated, but if a wider board can be obtained it will allow of the fibres lying approximately along the line of thrust, *AB*. This would render the heel of the lever less liable to crush with use. The lever should be at least 1½ in. thick—a little more if possible.

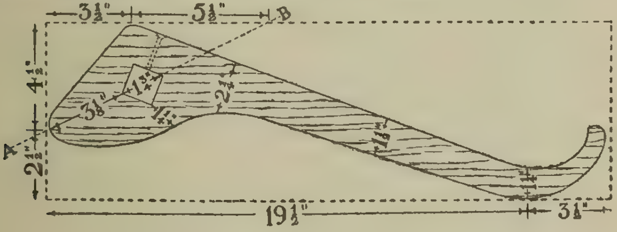


Fig. 18. Lever, showing Dimensions

The mortice for the spindle should be cut with care so that the spindle fits well. A screw passes through the back of the lever into the spindle. Bore for the screw and grease it, or it may snap off when being driven home.

A strip of brass or other soft metal should be fitted round the heel of the lever, as shown in the sketch, but there should be no screws where the lever heel fits into the thrust-block.

If the fitting of the spindle in the lever has not been accomplished satisfactorily the spindle may be glued in and small blocks glued in the angles between the faces of the lever and the spindle.

The thrust-block (Fig. 19) should also be of hardwood. Oak has been found to answer best. The ends of this block fit into housings on the pieces *H* (Fig. 15), and at the inner end is fitted a wedge which can be easily withdrawn when it is necessary to take out the block for adjustment of pressure. (See Chapter VI, p. 80.)

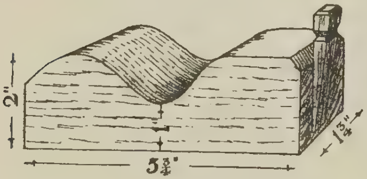


Fig. 19. The Thrust-block

Procure a ¾-in. bolt with a nut and four thin washers. A 12-in. bolt is only just long enough, and therefore a 13-in. one would be better, though it is rather difficult to obtain. If the bolt has a square shoulder under the head it should be filed round to correspond with the body of the bolt.

The various parts of the press are now ready to be assembled. The bolt, with a washer under the head, is passed through one of the toggle-arms.

Another thin washer is slipped on so that it will come between the arm and the bed. The bolt is driven through the holes in the bed, and the spindle, with the lever fixed in position, is placed in the upper hole of the toggle-arm.

Another washer is slipped on to the projecting bolt-end; the second toggle-arm is slid on to the bolt- and spindle-ends; the remaining washer goes on the bolt-end; and the nut is screwed on.

The wooden parts which are to be subjected to friction should be lubricated with powdered graphite mixed with a little lard. There are many parts of the press which might bear some small reduction in weight by being chamfered. This is the method by which a wheelwright lightens his timbers and shapes them to the thrust. Such ornamentation may be left to the fancy of the pupils—after the press has been in use for some time.

A piece of 3-ply tacked across the bearers at *S* (Fig. 14) makes a useful recess into which the prints may be made to fall by arranging a paper slide from the platen. The pupils will soon see the advantage of this and discover that a puff of breath will dislodge a print (if horizontal bands are used on the frisket) so that it falls into the recess.

A little grease should be put occasionally into the hollow of the thrust-blocks.

Finish off the press by giving it a coat of glue size and two coats of oak varnish.

The Chase

The chase (Fig. 20), the frame in which the type is locked, is best made of hardwood. If soft wood is used the material must of necessity be stouter, and this will reduce the working area. The outside dimensions will be a little less than those of the bed, to allow for fixing with wedges and to allow some slight movement for adjustment. (See Chapter VI, p. 78.) When some practice in printing has been obtained the chases may be made the same size as the bed.

As the chase needs to be perfectly 'square' at the angles and strong enough to stand considerable pressure from the quoins, the chase needs must be well made. The corners should be glued as well as screwed. If convenient to do so they may be bound with sheet metal, but this is not imperative. Take care that when finished the chase is not 'in wind,' *i.e.*, that it

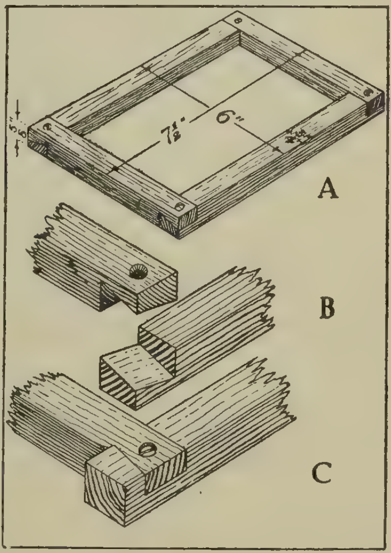


Fig. 20. *A*, The Chase; *B* and *C*, Alternative Joints at Corners

has not a twist. Alternative joints are shown at *B* and *C*. The choice of these will be governed by the capacity of the pupils.

Quoins and Side- and Foot-sticks

These are the type-wedges. Fig. 21 shows the cutting of a stick and of a pair of quoins. Fig. 39, Chapter V, shows the approximate lengths of the foot- and side-sticks, and how they are used. Well-seasoned oak or similar hardwood is necessary here, and the planing of the sawn surfaces needs care so that the outer edges of the stick and quoins are parallel when placed together. The piece is planed to $\frac{7}{8}$ in. or $\frac{3}{4}$ in. wide and $\frac{5}{8}$ in. thick.

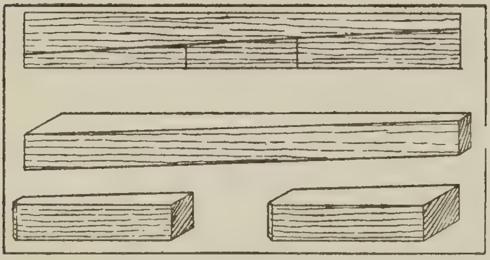


Fig. 21. Foot- and Side-sticks and Wedges

Galley

This is a tray (Fig. 22) consisting of a sheet of zinc, or similar metal, with a raised border of wood on three sides, the pieces being $\frac{5}{8}$ in. high and 1 in. wide. The frame must be square at the angles, and the inner edge is at 90 degrees to the zinc. It is better to screw the zinc to the frame rather than to nail it, as the latter method is inclined to buckle the sheet of zinc.

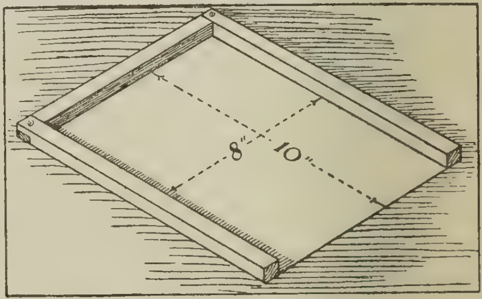


Fig. 22. The Galley

Composing-stick

The stick shown (Fig. 23) is of simple design, but it must be made with accuracy. As will be seen, it is made with a base of thin wood on which are fastened three pieces of hardwood. The pieces must be made at perfect right angles to each other and to the base. The simplest method of construction is to prepare the pieces and also an extra piece of the length and width of the recess in which the type is to stand during composition.

This piece must be a true rectangle, or the pieces *B* and *C* may not come out parallel to each other and at right angles to *A*.

The rear piece, *A*, can be glued on its lower edge and screwed into position. When this is set the extra piece is placed on the base, and pieces *B* and *C* are glued on their ends and undersides and pressed

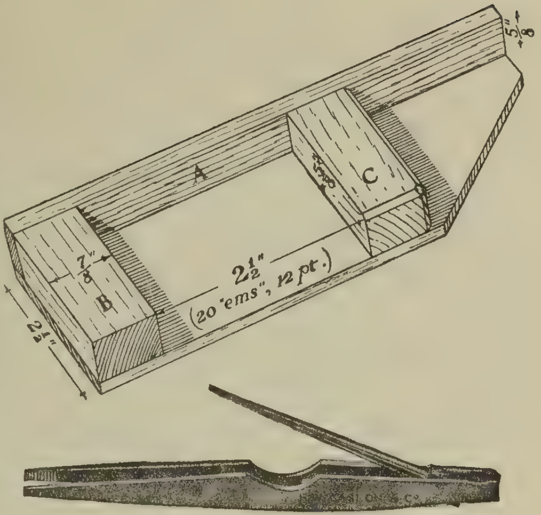


Fig. 23. Composing-stick, Tweezers and Bodkin

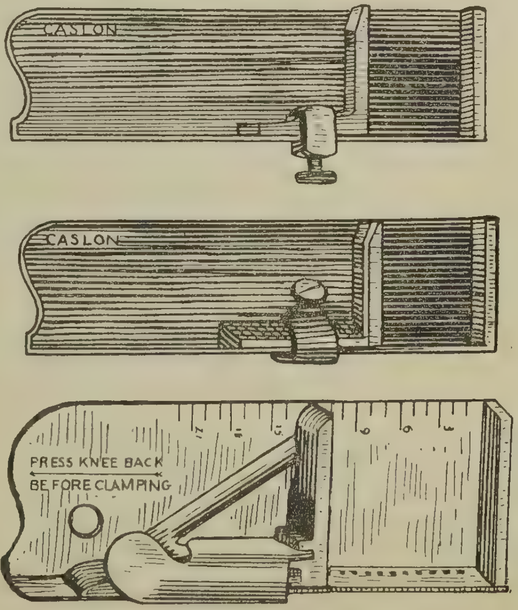


Fig. 24. Metal Composing-sticks

against the extra piece and the rear piece *A*. As much glue as possible is squeezed out and the whole put aside to set. The extra piece is removed and the surplus glue is cleaned off. Small screws may be put through the base into *B* and *C* after the glue has set.

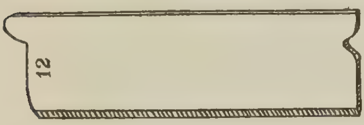


Fig. 25. A 12-EM SETTING-RULE

A few composing sticks of various sizes should be made. In 12-point type each em is $\frac{1}{6}$ in. deep. Therefore an 18-em stick will measure 3 in., a 16-em stick will measure $2\frac{2}{3}$ in., and so on. In 10-point type 20 ems will measure $2\frac{7}{9}$ in., 18 ems $2\frac{1}{2}$ in., 16 ems $2\frac{2}{9}$ in., and so on.

These sizes are best determined from the type itself, using em quads, or *m's* placed *on their sides*, because the measure of type is taken from the depth and not from the width of the face. Adjustable composing-sticks are shown in Fig. 24.

Setting-rule

A few setting-rules (Fig. 25) will be required. These can be cut from brass rule.

Shooting-stick

This (Fig. 26) is merely a stick of hardwood which is used with a mallet to drive the quoins. It is about 6 in. long, of a convenient shape, and made narrow at the end. In this narrow end a small notch is made so as to fit on the corner of the quoin. A professional shooting-stick is also shown. This has a gun-metal end.

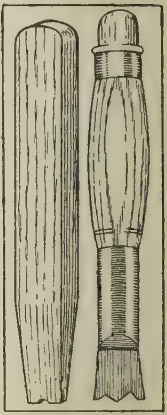


Fig. 26
THE SHOOTING-STICK
Left, home-made; *right*, professional

Forme-planer

(See Fig. 27, *A*.) A piece of hardwood, about 5 in. by 4 in. by 1 in., planed true on the under side, is used for knocking down the type in the chase after setting up. It is struck lightly with a mallet.

Proof-planer

(See Fig. 27, *B*.) A piece of hardwood, similar to the forme-planer, has a piece of ‘ blanket ’ or soft felt stretched over the under surface and tacked round the upturned edges. It is used for taking rough proofs (see p. 70).

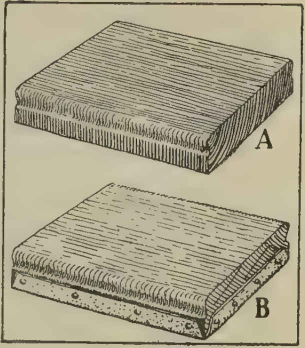


Fig. 27. *A*, Forme-planer; *B*, Proof-planer

Imposing Stone or Table

For this a rectangular piece of marble, slate, plate-glass, or any similar material with a smooth, flat surface will serve. It is cemented on to a board, and four pieces of wood are fixed round as margins. The marginal pieces are about $\frac{1}{16}$ in. thinner than the ‘ stone,’ so that the surface of the stone stands a little above the surrounding material. The open end of the galley of type is brought against the edge of the stone, and the type is drawn off the galley on to the stone, where it will stand without falling.

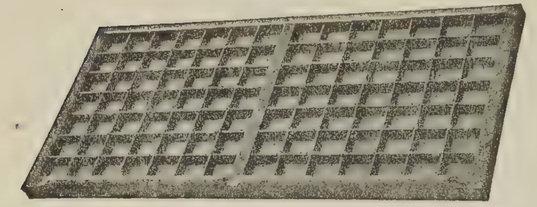
Needless to say, the imposing stone must be placed in a level position on a solid support for the above operation.

Ink ‘ Table ’

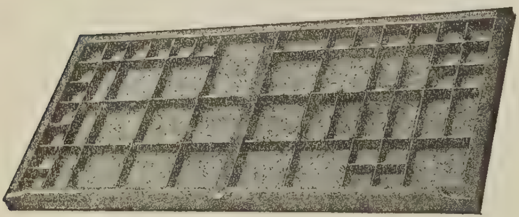
(See Fig. 45, Chapter VI.) A common school slate makes an excellent ink table. It will add considerably to the quality of the printing if the table can be kept free from dust and fluff. An easy method of securing this is to hinge two slates together so that one acts as a cover to the other when not in use. Both slates may be used.

The Roller

(See Fig. 45, Chapter VI.) The illustration shows the hand-roller used by printers. Keep it clean by washing it with lye, paraffin, or petrol. When the surface has become worn with use it can be re-covered, and should be returned to the makers for this purpose.



OLD LAY, UPPER CASE



OLD LAY, LOWER CASE

Fig. 28. Type-cases

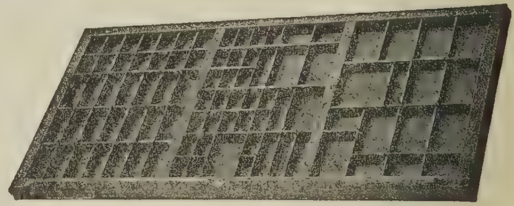
Moulds and composition can be purchased for recovering the rollers, but it is not an easy task for the inexperienced. The making of wooden moulds has been successfully accomplished, but it is a difficult task and one not to be recommended.

Tweezers and Bodkin

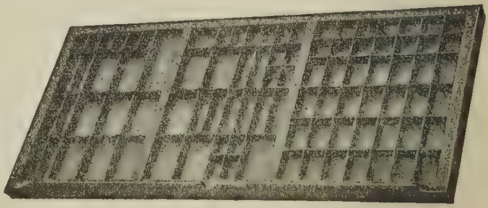
These may be purchased combined in one tool. They are indispensable for inserting and withdrawing letters (Fig. 23).

Type-cases

There are two designs of type-case, known respectively as 'old lay' (Fig. 28) and 'new lay' (Fig. 28A). In both styles it will be noticed that to some letters are apportioned a larger compartment than to others. These are the letters which occur most frequently in the English language and consequently it



NEW LAY, DOUBLE CASE



OLD LAY, DOUBLE CASE

Fig. 28A. Type-cases

is necessary to have a larger stock of them in the fount of type.

The arrangement of the case is such as will bring the commonest letters and spaces into the most convenient position, and in this respect the new-lay cases are much to be preferred to the older style.

As yet the new lay has not been widely adopted, but it is easier to work at, and if new cases are being purchased this kind should be specified.

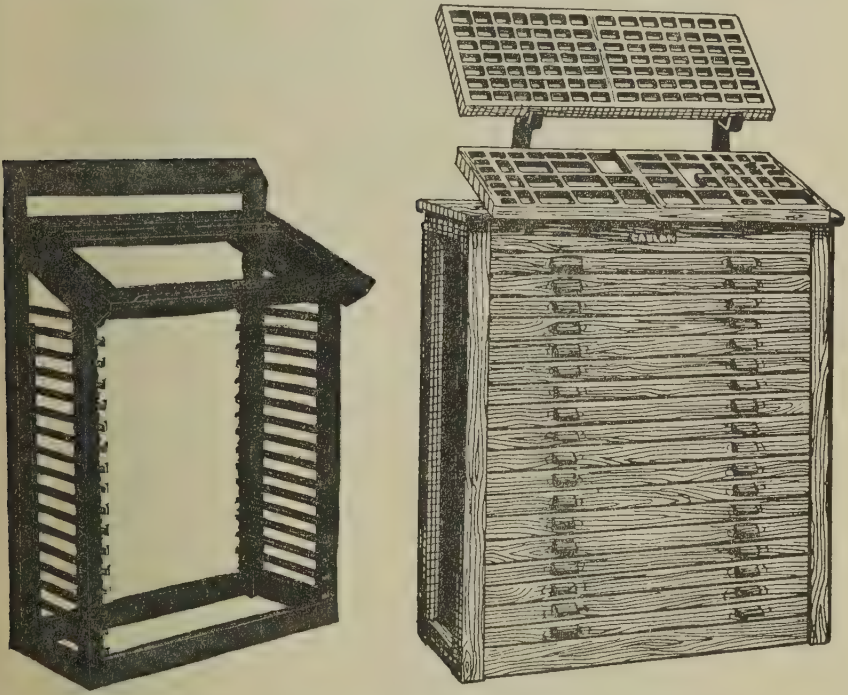


Fig. 29. RACKS FOR TYPE-CASES

Second-hand cases can be purchased, if allowances are limited, but cases may be made if the pupils are experienced in woodwork. The intersections are made with lap-halving joints, and the corners of the frame should be dovetailed if possible.

The bottom will be of 3-ply wood, screwed to the frame and nailed to some of the dividing slips.

A rack for the cases will be required. The best place for type when not in use is in a cupboard, and it should be possible to arrange slides so that a particular case can be withdrawn and returned without disturbing the others (Fig. 29).

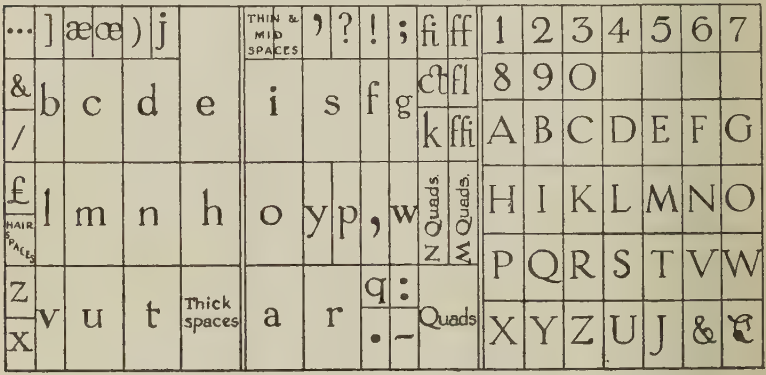


Fig. 30. A Convenient Arrangement of a Double Case

A convenient method in a classroom is to have a strong table, on which the press stands when in use, with runners on which the cases rest screwed to the legs. The type-cases should be easily accessible and protected from interference. When cases are in use there must be no risk of their being knocked over. ‘Upper’ cases contain capitals; ‘lower’ cases contain small letters, spaces, etc.; ‘double’ cases, which are the most convenient for schools, are a combination of upper and lower cases, the capitals being at the right-hand side. Fig. 30 shows a convenient arrangement of a double case (old lay).

CHAPTER V

The Type

Choosing a Fount

THERE are, unfortunately, many schools where the demands upon a restricted 'grant per head' will necessitate a minimum of expenditure on type and where even the cost of a case of new type can be afforded only at the expense of other necessary materials.

In such circumstances the difficulty may be overcome by purchasing second-hand type, and for this purpose the reader is referred to the advertisement columns of the printing-trade journals. A case of second-hand 10-point Clarendon served in the writer's school for a few years, and quite satisfactory results were obtained. But a word of warning is necessary. Worn and battered type is useless, or worse than useless, and should be melted down and recast to a modern face. Messrs H. W. Caslon and Co., Ltd., 82–83 Chiswell Street, E.C.1, undertake such work at a reasonable charge.

Old type should not be bought except from a reputable firm, and it will be wise to ask a printer to pass his opinion on the quality before purchasing. The writer has always found that printers have been extremely interested when his aims and desires have been made clear, and that they have been anxious to assist in the removal of any difficulties. Printers are, without exception, justly proud of their craft, and the reader who approaches them in the right spirit of inquiry will find them ready to assist with helpful hints and suggestions. It is often possible to buy from them a case of type at a moderate price if they know that it is intended for educational purposes.

The Use of Monotype

Newspaper offices working a Monotype plant do not print from loose type in cases, as will be seen on referring to the

Glossary at the end of the book. The metal used is not so hard as the usual type-metal, but with care the type will last in a school for a considerable time. Although there is no sale for it in the trade an interested newspaper proprietor will often sell a few pounds to a school, or he may even make a present of it to the budding printers.

The size of this type-face will be exactly the same as that used in printing the news-columns of the newspaper. There will be no quads (see Glossary) or large metal spaces, and when these are required in composition ordinary spaces must be substituted. The absence of quads is a disadvantage, but it does not militate against satisfactory results. A case, or cases, will have to be bought, or made, to accommodate the type.

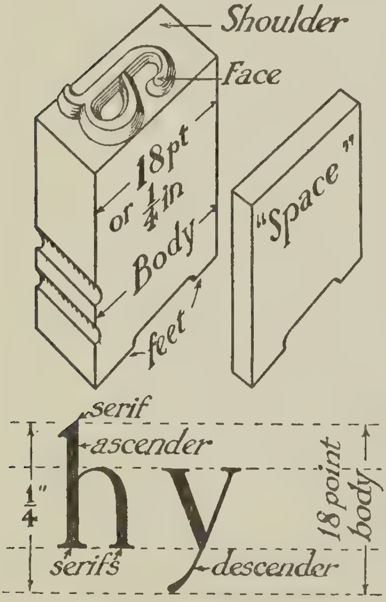


Fig. 31. A Piece of Type

Suitable Faces and Sizes

When the school finds it possible to buy some new type the first matter for consideration will be the 'face'—that is, the design of the letters—and the size. School printing demands a type with a good depth of cut, a clean, legible letter, and of a size which can be handled by inexperienced fingers. Modern type-faces fulfil these conditions, but there is in existence plenty of old type of shallow depression. This soon clogs with ink, and produces a smudge instead of a clear letter. A piece of type is shown in Fig. 31.

Beautiful faces are just as cheap as ugly ones, and a survey of typefounders' catalogues will give the reader an embarrassingly wide range from which to choose. Size is an important factor. Anything less than longprimer or 10-point is difficult for children to handle.

The writer has used brevier in the absence of any other, but it is extremely trying for small fingers and young eyes.

For general school work 10- or 12-point, with capitals, will be found most useful.

A few pounds of 18-point or 24-point in addition will be of great help toward a little display work, while some italic can be added with advantage. Caslon Old Face, Kennerley Old Style, Ratdolt Roman (Caslon) are all clean, open faces, easy to read, and beautiful in form. Titling Forum (capitals only) is a beautiful face of old-style letters corresponding to those on Trajan's Column in the Forum, and goes well with Kennerley.

For a suitable school outfit we suggest the following :

6 lb. fount of Kennerley, 10- or 12-point, l.c. and caps.
6 ,, ,, Caslon Old Face italic, 10- or 12-point.
4 ,, ,, Forum, 18-point.
4 lb. (1 lb. each) of leads, 1½-point, cut to lengths of 12, 16, 18, and 20 ems.
6 lengths of brass rule, 1½-point.
½ doz. each of reglet, 6-point and 12-point.

The above quantities may be added to as the work advances.

This would be sufficient to print a school magazine with a printed surface on each page of approximately 4½ in. by 3½ in. Allowing side and top margins of ¾ in. and bottom margin of 1 in., we have a page measuring 6¼ in. by 5 in. From such a quantity of type we should not be able to set up an unlimited number of pages without printing and distributing, but it would be ample for setting four or five pages at once, which could be printed and the type returned to the case in readiness for the following sheets.

Unpacking the Type

The type, when bought from a founder, will be packed in stout paper packages of about 9 lb. in weight. Considerable time and trouble will be saved if care is taken in unpacking.

Place the parcel on a galley which is tilted at an angle of about 45° away from the operator, and put a piece of stout furniture against the side of the package not supported by the galley side. Cut the cord, and with a penknife cut round the upper face of the paper, removing it, and exposing the face of the type.

The letters will be found to be arranged in rows, the rows being in alphabetical order. Of some letters, notably *e* and *a*, there will be more than others such as *j* and *k*, but the reader need not be concerned with the scarcity of certain letters in a fount, as the proportionate quantities have been established by long experience.

The letters can now easily be taken from the upper row with the thumb and forefinger and dropped into the correct boxes of the type-case. (See Chapter IV, Fig. 30.)

Composing

The matter to be set up is placed in a convenient position for reading by the compositor. The case should be directly in front of him, and tilted up at the far side. The composing-stick, if adjustable, is now set to the required length of line and held in the left hand, as shown in Fig. 32. If a fixed stick is used the length of line will have been determined.

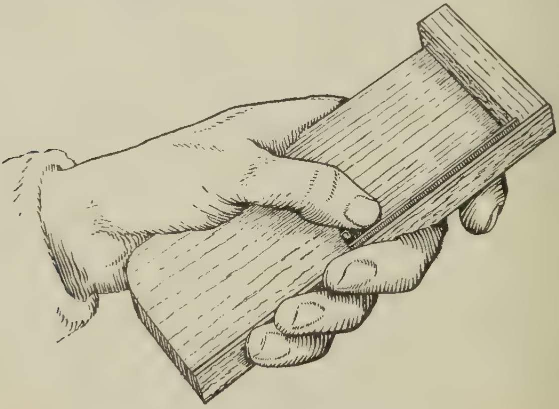


Fig. 32. Composing-stick in Position

Before the establishment of the now universal 'point' system the pica was the unit of measure, and lines were made up to lengths of pica ems, the em always being the square of any size of type-body. In the point system the pica was taken as a basis and assigned a value of 12 points, a point being $\frac{1}{72}$ in. A line three inches long would thus be 216 points in length, and as such measures would be inconvenient in use the older equivalent of 18 picas or pica ems is preferred.

Our composing-stick, if an adjustable one, will be set to something which will give us an exact standard for each line of matter, and it will be apparent that any variation in the lengths of the lines will cause trouble later.

The printer's method of setting the stick to a number of pieces of type—*i.e.*, 12-point ems, or their equivalent—is the best. Where the stick is likely to be used frequently for various lengths, metal gauges, *not* pieces of lead, are handy for setting to. In any case the gauge, whether a strip or type, should not fit too tightly. The slide is adjusted so that the gauge is just 'a glove fit'—neither too tight nor too slack. These gauges may just as easily be made to a measure of inches as of picas.

The next question is to decide whether we shall need leads between the lines. The two following passages will show the difference, the first being leaded with 1½-point leads, the other being set solid.

> The quays were lined with the famishing population, as the fleet rowed through the canals, every human being who could stand coming forth to greet the preservers of the city. Bread was thrown from every vessel among the crowd. The poor creatures who for two months had tasted no wholesome human food, and who had literally been living within the jaws of death, snatched eagerly the blessed gift, at last too liberally

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Obviously the greatest economy of space will be achieved without leads, although the mass of type will be less easy to handle when transferring it from the stick to the galley. For our first venture it will be best to use leads.

Let us assume that the following piece of prose by R. L. Stevenson and the verse from Shakespeare are to be set up in type:

THE MAP-LOVER

I am told there are people who do not care for maps, and find it hard to believe. The names, the shapes of the woodlands, the courses of the roads and rivers, the prehistoric footsteps of man still distinctly traceable up hill and down dale, the mills and the ruins, the ponds and the ferries, perhaps the *standing stone* or the *druidic circle* on the heath; here is an inexhaustible fund of interest for any man with eyes to see or twopence-worth of imagination to understand with!

R. L. Stevenson

* * *

Jog on, jog on the foot-path way,
And merrily hent the stile-a:
A merry heart goes all the day,
Your sad tires in a mile-a.

We decide the length of the line to be, say, 2½ in. Set the stick to a gauge of that length, and place the setting-rule in position. The setting-rule provides a smooth surface for the type to slide along when justifying. The gauge if of strip brass or other metal can be left in the stick. It will be useful when lifting the type out of the stick.

The title will come first. From the right-hand side of the double case pick up a capital *T* and place it, nicks upward, in the corner of the stick so that it rests against the rule and the slide. Keep the stock-end of the stick tilted up a little to prevent the letters from falling forward. The tip of the thumb will hold the letter in place (Fig. 32.) Capitals *H* and *E* are next placed in the stick, followed by a space. *M*, *A*, and *P* and a hyphen come next, followed by *L*, *O*, *V*, *E*, *R*. Periods, or full stops, are not used after titles. As the line of letters does not fill the stick we make it up with spaces, the larger the better. As the title is to be in the centre of the page half of these spaces require to be brought to the near end of the line. Lift them out and, sliding the letters along, drop the quads in place. We should probably find that the line is slack in the stick, and, as it *must* fit, we proceed to 'justify' the line by adding additional spaces. The space to be filled is too small for either an em or an en quad. Try a middle space. If the line is still too slack add a thin space, a hair space, or any combination of spaces until the last space can just be pushed into line. Thin and hair spaces are easily broken if one tries to ram them in, so take out one of the quads and replace it after the thinner spaces are inserted. *Always avoid small spaces at the end of a line.* Place them elsewhere, and reserve the end of the line for as large a space as possible. Having justified the title, we drop another lead (or two, if more space is needed) in place, and bring the setting-rule on top.

'Lower-case' letters are needed now for the text. These are found in the lower case when using single type-cases or in the left-hand side of the double case.

We begin by indenting with an em space, followed by a capital *I*. A space follows the initial, then *a*, *m*, space, *t*, *o*, *l*, *d*, space, and so on until we reach the end of the line.

It is unlikely that we shall find the last letter just filling the line, so we make it do so by inserting additional thin spaces between the words already composed until the line is just fitting.

We place another lead in position, bring the rule to the front, and continue with the next line as before.

The last word in this line may be too long to go in. Try reducing the spaces between the words by substituting smaller spaces.

If this is not sufficient restore the original spaces, and divide the word by a hyphen if the syllables allow it. If this cannot be done, take out the portion of the word, insert additional spaces between the other words to make the line justify, and bringing the setting-rule forward, begin the next line. The full stop after ' believe ' is followed by an em quad to emphasize the pause. Ordinary spaces follow commas.

The last letter of the last word in each line must come against the stock of the stick ; there must be no spaces at the ends of the lines of words, except in cases where the matter is indented purposely, or at the end of a passage when the last line is not of the same length as the others. *Always read the line carefully before passing on to the next.* We continue to set up the lines of matter as above until completed, bringing the setting-rule to the front as each line is finished.

For "standing stone" and "druidic circle" use italics if you have them.

An exclamation mark and the author's name complete the passage.

A lead follows, and the three ornaments, or some similar ' break ' are inserted in a line made up of quads and spaces. Spacing material follows these, and we begin the verse.

Set the line as the title was set, and divide the spaces equally between each end. Indent the second line with an em quad before the initial letter. The initial of the third line will come exactly under that of the first, and the fourth line will be indented as the second.

A little extra care in spacing is worth while. Experts increase the spaces between words ending and beginning with ascenders, decreasing the spaces where sloping letters, as *v*, *y*, *w*, are adjacent, and where commas occur.

The following example—a report from a school magazine—will entail more labour than the example just described. The title and the opening paragraph are straightforward work, but the remainder presents a problem in spacing and display.

DEBATING SOCIETY

This Society has again had a very successful session, meetings being held every week in the term, and we must congratulate its officers on their choice of subjects, and its members on their keenness in turning up to the lectures and debates.

First Meeting .. .. September 25th

The following officers were elected :

President .. .. .. Mr Harris
Chairman .. .. .. Mason
Secretary .. .. .. Clarke
Committee .. .. .. Keevil, Barnard, Howland, Telfer

It was decided to ask Mr Kay to give the first lecture.

Second Meeting .. .. October 2nd
Lecture by Mr Kay on "Palestine"

Seventy-three members present, including Messrs Dollan, West, and Collier.

Third Meeting .. .. October 10th
Debate : "That Turkey should be allowed at Peace in Europe."
Proposed by Clarke. *Opposed by* Barnard.
Majority for motion, 13. Fifty-seven members present.

Fourth Meeting .. .. October 17th
Debate : "That Stamp Collecting is the best Hobby."
Proposed by Mason. *Opposed by* Reynolds.
Majority against motion, 13. Forty-six members present.

A piece of brass rule is needed under the title. This will be made out with leads of the same thickness, the whole line being sandwiched between spacing material. A couple of leads, or a piece of reglet, precede and follow the line "First Meeting." This line requires quads and spaces at each end.

"The following officers . . ." is indented and closed with a colon.

The next line is leaded, indented to bring "President" under "First," and spaced out with quads until "Mr" is reached.

Spaces are withdrawn to allow the insertion of 'leaders' to carry the eye along the line. The following lines are the same, except that in the last the four names of the Committee will not all go into one line.

If possible, italics should be used for the names of the various offices. The remaining lines are similar to the above, and need not be described.

Spacing material should be inserted between the different lines as shown.

For quotation marks use apostrophes at the end of the words, and ordinary commas, inverted, at the beginning, followed by a space.

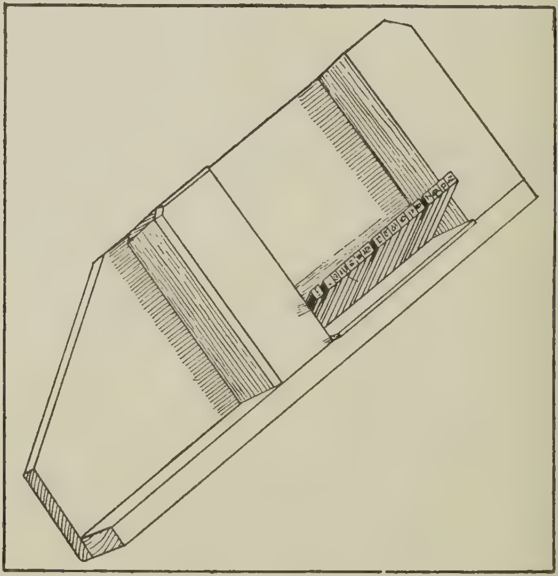


Fig. 33. A Test of Correct Justification

The Importance of Justification

The need for perfect justification cannot be over-emphasized. If some lines are but a fraction longer than others they will take the pressure when locking up in the chase, leaving the short ones loose and therefore a certain source of trouble. It is easy to avoid this if a simple test is made as we complete each line. The setting-rule is lifted a little at its upper edge, and if the line of type will stand unsupported at this slope, justification is absolutely correct (Fig. 33).

Emptying the Stick

In the early exercises in composing it will be unwise to fill the stick to its capacity before emptying it. When about six lines have been completed, transfer the type to the galley as follows. Rest the stick on the case, or desk, and place the thumb and first finger of each hand to the type as shown in Fig. 34. The setting-rule, or a lead, should be on top of the last line set. There is already a piece of material behind the first line. Grip the type firmly, give it a forward and upward rolling motion

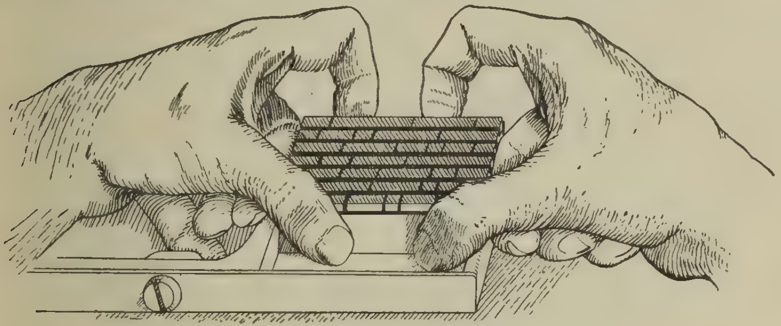


Fig. 34. Lifting the Type from the Stick

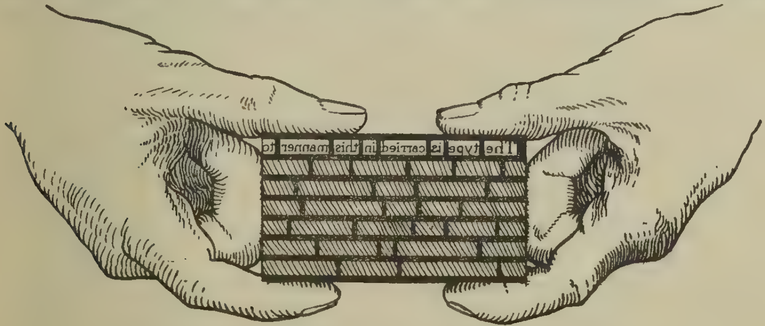

The type is carried in this manner to

Fig. 35. Carrying Type from Stick to Galley

away from the operator, bringing the middle finger of each hand against the sides of the type with firm pressure. The stick is held down by the little finger of the left hand. If the lines have not been packed too tightly the mass will lift out smoothly, and, in the position shown in Fig 35, it can be carried to the galley on which it is placed.

The operation must not be hurried, and pressure on the mass should be maintained the whole time.

It has been found convenient for children to have the galley tilted as shown in Fig. 36.

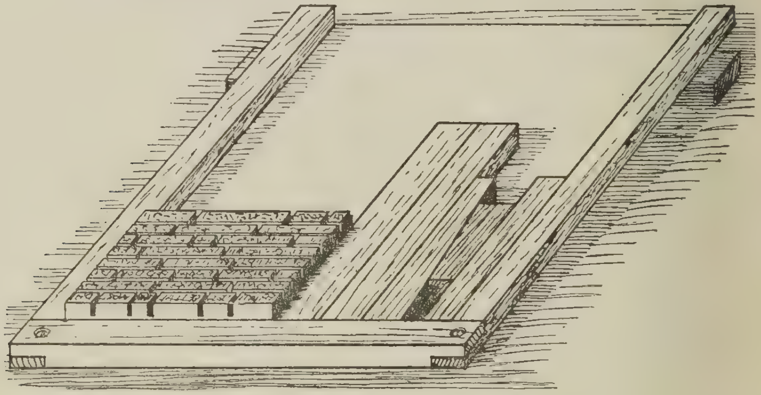


Fig. 36. Position of Galley

On reaching the galley the mass of type, now held vertically, is lowered until the under edge is in contact with the metal; by a similar rolling motion as when taking the type from the stick, but in a reverse direction, the type is brought " on to its feet " and drawn into a corner of the chase as in Fig. 34.

Wood or metal 'furniture' is ranged along the open side, and this will be more effective against accident if secured by a side-stick and wedge as shown.

The setting of the remaining matter is resumed, without the slightest alteration of the composing-stick, the type being transferred in due course to the galley, where it is placed against the first batch. The wedge will be drawn slightly to allow space for the second portion to move down. This is repeated until sufficient matter for one page is accumulated.

Possibly the novice will have dropped a letter or two *en route* ; these will be picked up and restored to correct position. In extreme cases of difficulty in handling the mass of type the writer has advised the wetting of it by sprinkling water over it. This helps to bind it together, but the type must be dried before printing. Such a remedy should only be tolerated with small children.

It may appear from the above that the handling of type is a difficult task. Actually it is quite an easy and interesting operation, and the very necessary factor of confidence is established after the first essay. If it is desired to space out any lines by the further addition of leads or reglet these should be inserted while the type is on the galley (not tilted), using a setting-rule and bodkin to open the masses. For small jobs the writer's practice is to get the children to space out in the stick.

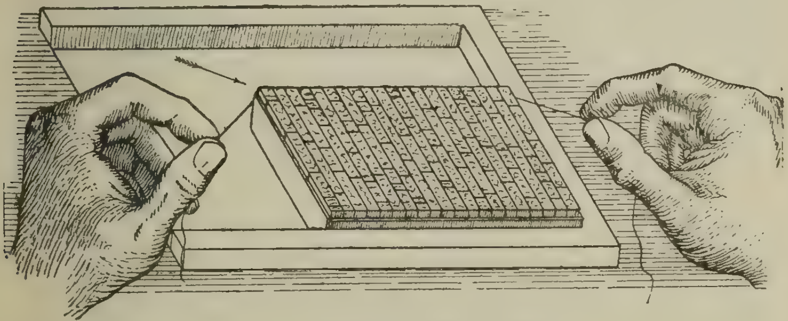


Fig. 37. Tying up the Type

Tying up the Page

After the type has been opened out and the additional spacing material inserted to ensure a good display, the type is tied up ready for 'pulling' a proof.

A thin, slightly elastic cord is needed ; thin *macramé* thread is as good as anything. Whatever material is used it must be strong, for a broken cord may result in disaster. If the mass of type is more than two inches in length place a lead along the sides before tying up.

The cord is carried round the mass as shown in Fig. 37, care being taken to keep the pull in the direction of the arrow. On completing the first turn tuck the loose end under the cord, and proceed to add three or four turns round the mass, keeping the cord taut and avoiding overlapping of the layers. Try to get the lines of cord touching each other and parallel to the feet of the type. Fig. 38 shows how the last turn may be secured by using the setting-rule.

If you are certain that the type is correctly set in every detail it may now be locked up, but as very little trouble is entailed in taking a rough proof, it should be done now.

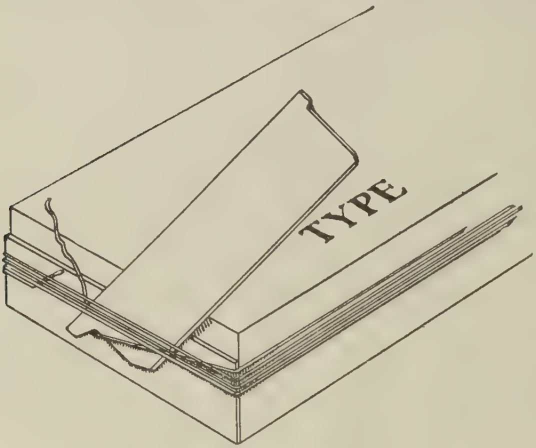


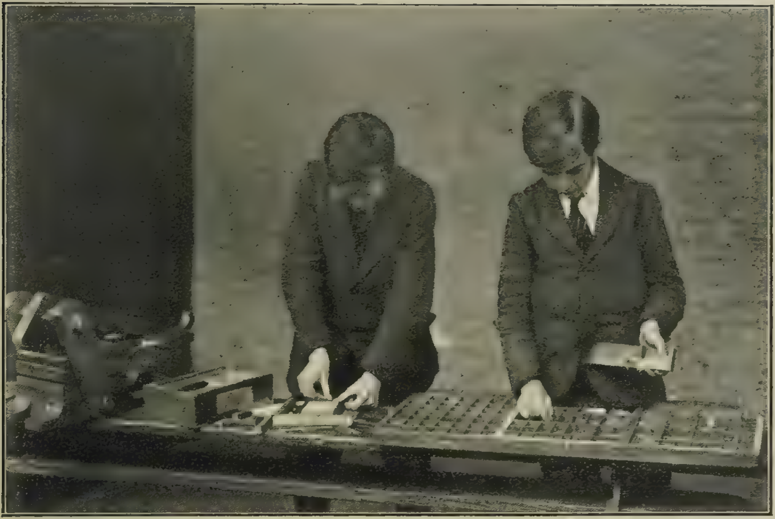
Fig. 38. Securing the Last Turn of Cord

Secure the type from falling by restoring the furniture, which will have been removed during tying up. Carefully ink the type with the ball or roller. Take a piece of thin soft paper, larger than the type surface. Holding this diagonally, let the centre sag on to the type surface and at once allow the paper to fall into place without the slightest drag. Place the proof-planer (Fig. 27) on top, and tap lightly with a mallet, taking care to prevent the paper from slipping over the surface and so smudging. Lift the planer with a rolling movement, or it may suck up the paper with it.

When the paper is raised it will be found to be embossed on the back, the type having been driven in by the soft felt; while the proof will not be acceptable as an example of printing it will serve to show the faults in spelling and composition.

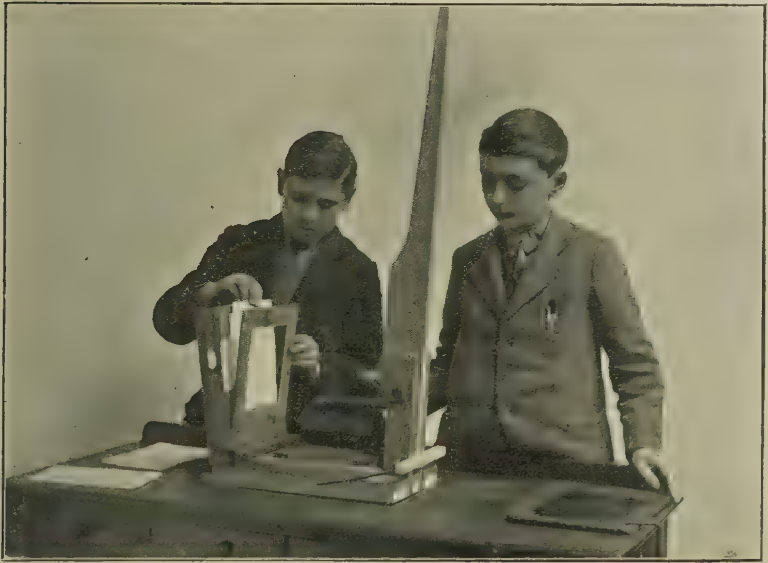
Correction

The patience of the young (or old) printer will be tried when



Composing and Locking up

The folded press is shown at the left. For the purpose of the photograph the type-case is shown flat and not tilted.



The Smaller (Lever) Press in Use

The platen will be lowered and the lever pulled down from the left. The springs will return the lever to the vertical position.

he finds words wrongly spelt, or perhaps a whole line missing. Wrong letters can be separated with the bodkin, picked out with the tweezers, and the right letters inserted. This will require care, or we may have trouble with justification. An *m* cannot be substituted for an *i* without an adjustment of the spaces in the line. If a narrow letter is to replace a broad one, test the two together, building up the lesser one to the width of the other with thin or hair spaces, and insert the spaces with the others between words. Although the lines will have been read in the stick during composition, it is surprising how mistakes creep in, and a warning to be more careful next time will be quite unnecessary.

A little experience will show which letters are of the same thickness and can therefore be exchanged without altering the length of the line. The usual errors are *b* for *d*, *n* for *u* ; and of course the injunction to " mind your *p*'s and *q*'s " is particularly applicable to young printers !

Locking up

Assuming that the corrections, if any, have been made and the proof passed as satisfactory, the type will now be fixed in the chase ready for printing.

The galley is taken to the imposing table (Chapter IV) and the type is slid carefully into the centre of the flat surface, where it will stand unsupported.

The chase is placed round the type, and pieces of furniture of convenient length are put in position at the top and right-hand side. The chase is drawn lightly down toward the left, bringing it into contact with the furniture. Foot- and side-sticks are slipped into position (Fig. 39) and the quoins placed ready for driving.

Try to bring the type, when fixed, into the centre, or thereabouts, of the chase. If a large forme is being printed this may be a difficulty because of the space needed for the wedging material, but if there is a fair amount of space available the type can be adjusted by putting pieces of reglet behind the furniture. For finer adjustment leads may be used.

The binding cord is now unwound with care, the leads are removed, and the quoins under the foot-stick pulled up ‘finger-tight.’ The side quoins are then pulled up. Take the shooting-stick and mallet, and drive the foot-quoins up tight—each a little at a time.

Never drive the side wedges first, or they may cause the lines to buckle and the leads to spring. For the same reason *always loosen them first* when unlocking the type.

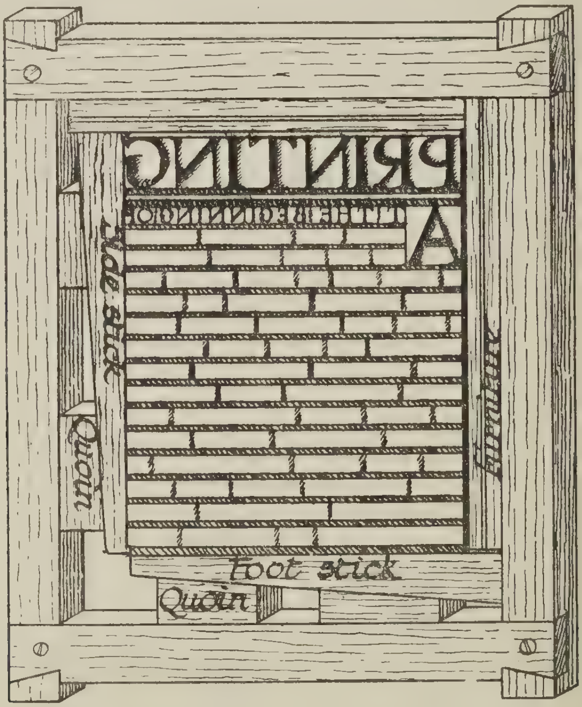


Fig. 39. Type locked up in Chase

After the foot-quoins are tightened, drive in the side ones in the same way.

Now tap the type surface level with the forme-planer and mallet. This must be done lightly, or the face of the type may be damaged.

Test your locking up by slightly raising one end of the chase.

If your work is faulty some of the letters or spaces will drop down. The quoins may not have been driven evenly or sufficiently, but do not attempt to drive them unduly, or the chase will be sprung and distorted. Brute strength will not overcome the trouble, and the fault will usually be found in careless justification when composing. This can be corrected by drawing the quoins a little and inserting a hair space or two where needed.

There is a craftsman's feeling of satisfaction when one finds the type, furniture, and chase binding together in a solid mass which may be turned in any position without the fear of a single unit being loose.

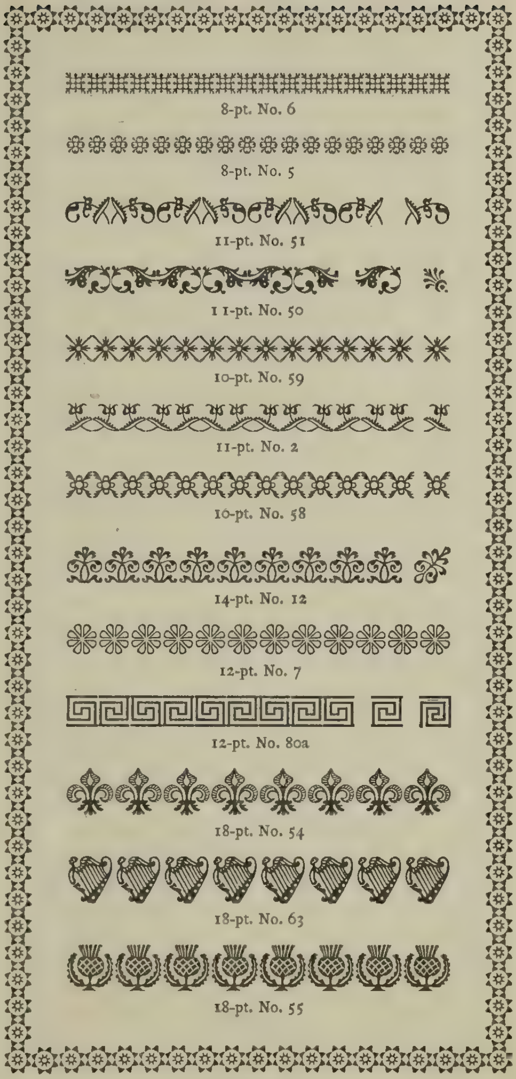


Fig. 40. Borders and Ornaments (Caslon)

Frames and Lines

Where frames and lines are required round or between sections of printed matter they are made with brass rule, which is manufactured in various thicknesses and cut to lengths of ems. These are supported on edge by spacing material or furniture.

Corners of frames can be purchased ready cast, and the straight pieces joined up to them. Straight pieces can be mitred with a file, but it is an operation demanding considerable skill and judgment. There are machines for the purpose, and the rule can be bought already mitred.

Ornaments and Borders

A few typical ornaments (Caslon's) are shown in Fig. 40. These embellishments are quite cheap, and can be bought in small quantities.

They offer scope for judicious display, and will make pleasing a piece of printing which might otherwise be comparatively unattractive. Each is cast in units which are so perfectly finished that when printed they appear as one solid piece. They are set up in the same way as the type, and many of them are capable of being built together to form larger masses of various shapes.

Numbers 50 and 51 are akin to the old printer's ‘flowers,’ and may be arranged in other combinations than those shown.

It is possible to design and make simple ornaments and devices in wood, linoleum, and zinc as is described in Chapter VII. Many opportunities will occur where they may be introduced into the printed matter, adding considerably to the appearance of the page.

Special Cases of Type-setting

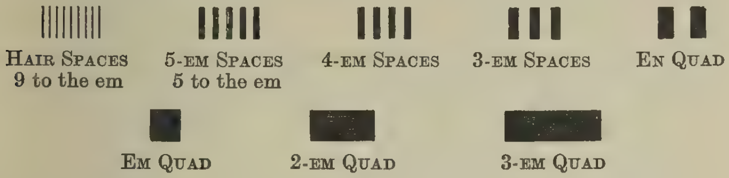
When it is required to set up two sizes of type in one line it may be done by adding leads above and below to bring the smaller type into alignment. In the following example the large capitals are 18-point and the smaller 12-point. The rules show how the leads would be placed to secure alignment. A 3-point and 2-point lead would be employed above the smaller capitals, and a 1-point lead below.

PRINTING FOR SCHOOLS

The Type

Sizes of Spacing Material

The following examples relate to pica or 12-point type:



Examples of Type-faces

12-point Caslon Old Face

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of mankind. And even if death catch people, like an open

10-point Caslon Old Face

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of mankind. And even if death catch people, like an open pitfall, and in mid-career, laying out vast projects, and planning monstrous

8-point Caslon Old Face

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of mankind. And even if death catch people, like an open pitfall, and in mid-career, laying out vast projects, and planning monstrous foundations, flushed with hope, and their mouths full of boastful language, they should be at

12-point Garamond

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of

12-POINT PLANTIN

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of mankind. And

12-POINT IMPRINT

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has *left a hopeful impulse behind it in the world* and bettered the tradition of mankind. And even if death catch people, like

12-POINT CHELTENHAM OLD STYLE ITALIC

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has left a hopeful impulse behind it in the world and bettered the tradition of mankind. And

10-POINT CHELTENHAM BOLD

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has left a hopeful impulse behind it in the world and bettered the tradition of

12-POINT CHELTENHAM BOLD COMPRESSED

All who have meant good work with their whole hearts, have done good work, although they may die before they have time to sign it. Every heart that has beat strong and cheerfully has left a hopeful impulse behind it in the

12-point Titling Forum

ALL WHO HAVE MEANT GOOD WORK WITH THEIR WHOLE HEARTS, HAVE DONE GOOD WORK, ALTHOUGH THEY MAY DIE BEFORE THEY HAVE TIME TO

Rule Faces

The following are specimens of brass rule:

3-point

1½-point Foot Face

1½-point Medium Face

1½-point Fine Line

6-point

5-point

3-point

3-point

3-point

3-point

2-point

2-point

1-point

CHAPTER VI

Making Ready and Operating

Making Ready

WE are now ready to go to press and pull our first proof. The term 'making ready' covers an operation which occasionally is a trying detail of printing even on modern machine-presses. The reader will appreciate the fact that the slightest variation in the height of the pieces of type or the most minute irregularity in the pressure-surfaces will cause some portions of the face to print firmly while others may barely reach the paper, and so give what printers term unevenness of 'colour.'

Making ready is the task of packing one or the other of the pressure-surfaces—the bed or the platen—with paper so that either the depressed type is raised or the platen surface is made to correspond with the surface of the type.

These inequalities are overcome by using tissue-paper, pasting it on where the impression is light, and cutting it away where the impression is too hard. It is therefore simpler and easier to pack the platen than to raise the type by inserting paper underneath. With new type the need for 'make-ready' is very small, if it exists at all, and if our standard is a low one we can always introduce some soft material, as printers' 'blanket,' between the paper and platen. If we use such soft packing the type will be pressed into the paper, and the print will be correspondingly embossed at the back. This 'nutmeg-grater' effect will have to be removed later by ironing or passing between rollers. It is certain that we shall not be satisfied with such results, and there is no reason why our work should not approach perfection.

We will pull our first press proof as follows. The forme—*i.e.*, the type locked up in the chase—is placed on the bed of the press and the type inked with ball or roller. Place a double piece of good quality paper on the platen under the frisket.

Always use smooth paper when taking a press proof, or you may get an unsatisfactory proof, and consequently may seek to remedy a fault in the type which is actually in the paper.

Lower the platen on to the type, lift the lever-heel in place, and pull down till the lever has passed the centre of effort. Push the lever back, lift the platen, and take out the print.

The impression may be perfect, and the printing may then proceed without further ado. More probably it will be uneven in texture. As a rule the best ‘colour’ occurs in the centre of the face, the quality decreasing toward the outer edges.

We may find the best of impressions at one side of the face and practically none at the other; so before we begin actually to make ready we should try a few prints with the chase in various positions on the bed until we are satisfied that further adjustment in this manner will give no better results. Then the chase should be fixed in position by wedges between it and the raised ends of the bed.

If the fault is a serious one it lies in the construction of the press, and some correction needs to be made there.

Making Ready Proper

Fold a piece of hard smooth foolscap so that when cut to size the doubled sheet is exactly the same size as the platen. Fix to the edges of the platen with a few pieces of gummed paper. We can call this ‘hard packing.’

Take a print directly on to this, and it will make apparent any irregularities. On those places where the impression is weak paste pieces of tissue-paper which have been shaped roughly to the areas needing more colour. These tissues are better if torn with the fingers than cut with scissors. The soft furry edge thus obtained obviates hard edges or ‘steps.’

Take another print, and note the effect of the added slips. With this print as a guide add any further packing necessary until a print is obtained which is free from any greyness of colour and so presents an even mass.

Should the depressions be too deep for tissue-paper (which usually measures $\frac{1}{1000}$ in. in thickness) use stouter paper.

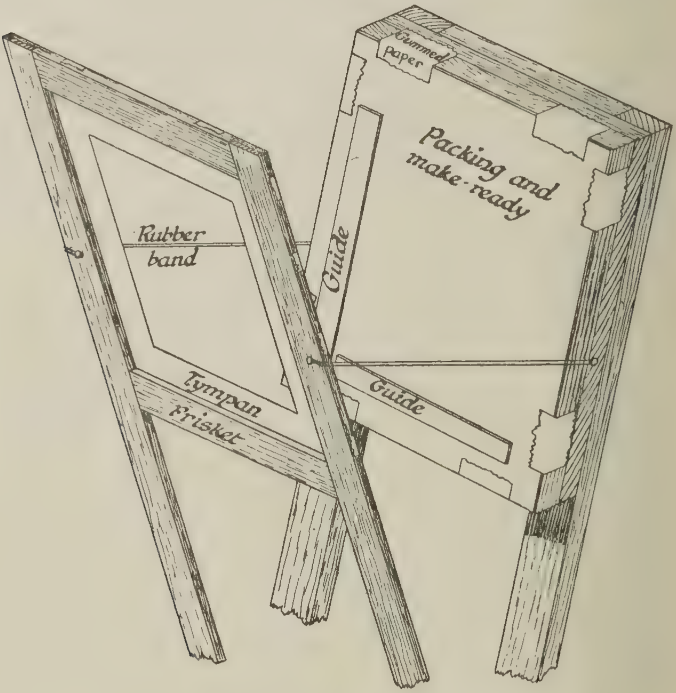


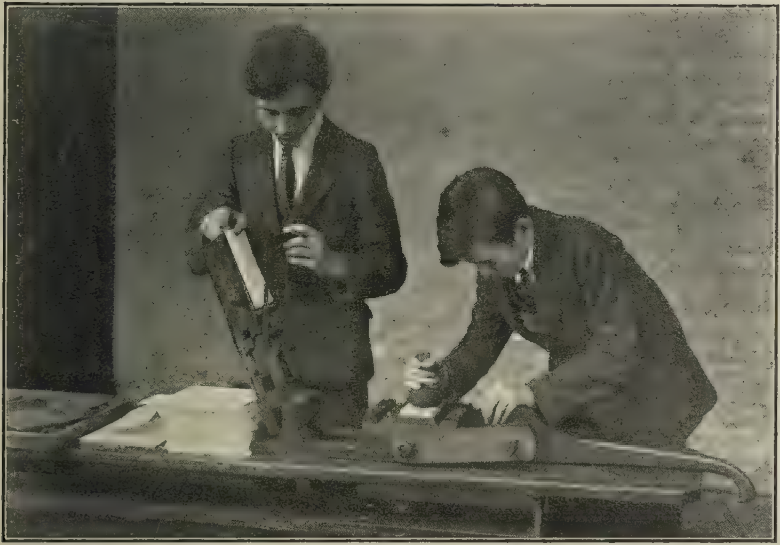
Fig. 41. The Frisket lifted, showing Guides

Such a need would be exceptional, and is extremely unlikely to arise.

When satisfied with the make-ready paste a thin sheet over the whole so that the backs of the prints shall not be soiled. When this is dry the actual printing can go ahead.

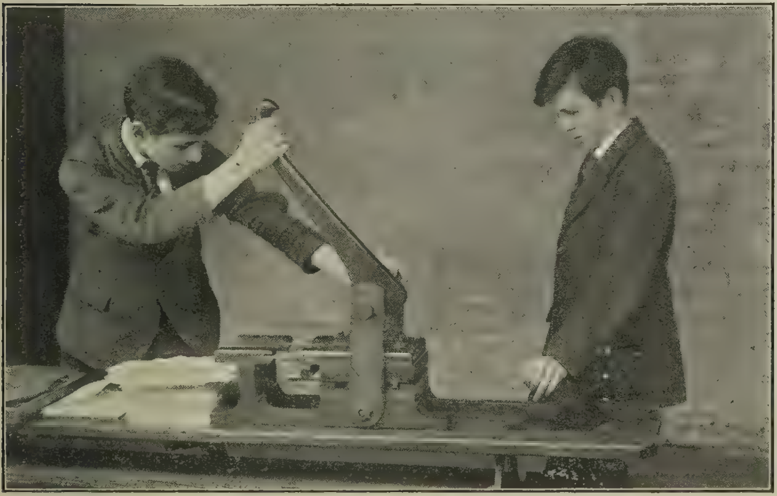
Should the quality of the printing suggest greater pressure this can easily be increased by placing strips of hard paper, or thin card, under the thrust-block on the top of the platen.

The exact pressure required for good printing cannot be



Printing the School Magazine

The sheet is inserted under the frisket while the type is being inked. The toggle is thrown clear of the bed.



The Impression

The toggle heel is in the thrust block, and the pressure is just about to take effect.

described in writing, but it should not be necessary to force the lever by great strength. The adjustment, *via* the thrust-block, should provide sufficient resistance to require a ‘good pull’ from a boy of about eight years of age.

It is always best to secure the press to the bench or table with small cramps. Fretwork cramps are suitable.

To avoid soiling the sheets make a frisket face or ‘tympan,’ with an aperture just larger than the type. This is fastened to the frame with slips of gummed paper (Fig. 41).

A couple of rubber bands should be slipped over the frisket, though thin cords, fastened as shown in Fig. 42, *B*, will be almost as effective.

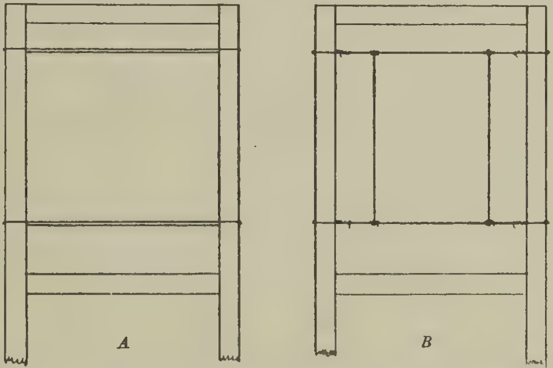


Fig. 42. *A*, Rubber Bands stretched across Frisket; *B*, Cords stretched to hold Print to Platen

To ensure correct registration of the print on the paper, guides are required as shown in Fig. 41. They may be of thick card pasted on to the packing sheet. A better plan is to glue three or four thick spaces or quads in position, avoiding the least trace of superfluous glue on the side where the edge of the paper will strike the quad (Fig. 43).

Should the print tend to stick to the type, fenders will be found useful. These are small pieces of thin card bent at right angles and gummed on one half. They will fold down on to the sheet during the process of printing, and care must be taken that they do not touch the type.

It is a good plan when fixing the quad guides to fasten them with a piece of gummed paper as shown in Fig. 43.

The fore edge of this paper is slipped under the packing *via* a V-shaped slit. This raises the packing sheet a little, the effect of this being to throw forward the sheet to be printed, so bringing the edge right on to the flat of the quad.

Operating the Press

It is best to have two boys to work the press, one to see to the inking, the other to attend to the feeding and delivery. As the ink on the brayer table (see p. 84) becomes exhausted a very little more will be added and well rolled out. The table must be kept clear of dust and anything which will tend to foul the printing.

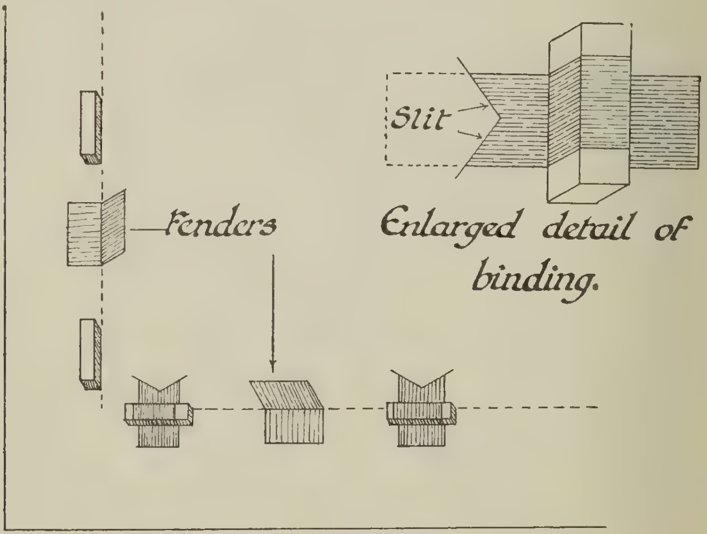


Fig. 43. Guides and Fenders in Position

The wet sheets as they are taken from the press cannot be laid one on top of another because of offsetting. The sheets should be spread out to dry and collected as soon as they may be handled safely. Some inks are rather slow in drying, while others will allow the sheets to be handled quite soon. If the ink is particularly slow it may be hastened by the addition of a very small quantity of ‘ driers.’

Printing in Two Colours

Coloured initials and ornaments can be inserted without much trouble.

The preparation of the required ornament is described in Chapter VII.

When the ornament-block is being made, a plain one of the same length and width, but one-eighth of an inch less in height, should also be made. This is, as it were, " a lino block without the lino." This is set up with the type when composing, just as if it were the ornament or initial itself; and therefore there will be a corresponding space in the black printed sheet.

Print the black matter as before, and, having completed the batch, draw the type wedges or quoins slightly, and lift the plain block, or blocks, out, slipping the cut blocks in their places. Be careful not to move the forme during this operation or the coloured portion will be out of register.

A new frisket sheet will be needed, with spaces cut out to correspond with the new insertions.

Assuming the page shown in Fig. 44 to be our task, the frisket will need to be cut out to allow the title, the initial, and any other ornament to pass through and reach the paper. Raise the colour blocks slightly above the face of the type by a piece of cartridge-paper placed underneath. The effect of this will be to prevent any impression from the type reaching the paper. To compensate for the additional height take out a corresponding thickness from under the thrust- or pressure-block on the back of the platen. If the ornament is only at one side of the type the platen is liable to cant a little and so to print badly. In such a case a piece of packing, of the same height, should be added at the opposite side, and if this is difficult to insert it can be built up on the frame of the chase. (This would apply only if the ornament were of a colour different from that of the type; as if of the same colour it would be set up and printed with the type.)

Ink with whatever colour is desired, using a small ball for the purpose. Take care that the partly printed sheets occupy the same position on the platen as when taking the black print, and, lowering the platen, print as previously described.

To ensure accuracy in cutting out the portions of the frisket, take a print directly on to it from the forme, and cut out the impressions from the blocks, allowing a small margin in addition, or the edges of the apertures may be jammed between block and paper.

Inking

See Fig. 45. The preparation of the ink requires a little attention if it is to produce the best results. Use a sheet of plate-glass, or better still, a smooth, framed school slate for your ink bed, or brayer.

Take a portion of ink, about the size of a hazel nut, from the tin with a small stick or an old table-knife, which should be kept for the purpose. Spread this roughly at the head of the slate and work a little of it down with the roller, or ball, until a thin film is evenly distributed over the surface.

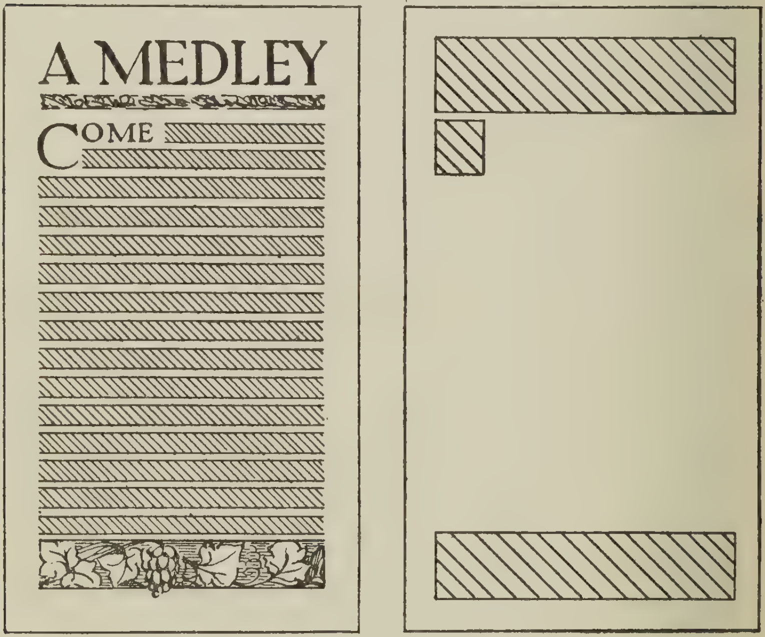


Fig. 44. Tympan set for Two Colours

Run the roller up, down, and crosswise, lifting it occasionally to make distribution even. The inked roller is passed over the type without pressure other than that of its own weight. The ball is charged with ink from the plate, and then dabbed over the type. Avoid over-inking, or the type will be filled and give foul printing, or choking of the letters. Uneven distribution with the ball will leave 'monks,' or blotches of ink.

Protect the brayer from dust and fluff.

Ink rollers are made of a soft, gelatinous composition, consisting mainly of glue and treacle, and if left lying on tables for any considerable time 'flats' are formed on the surface and spoil it. For this reason the roller should always be suspended on a wire hook when not in use.

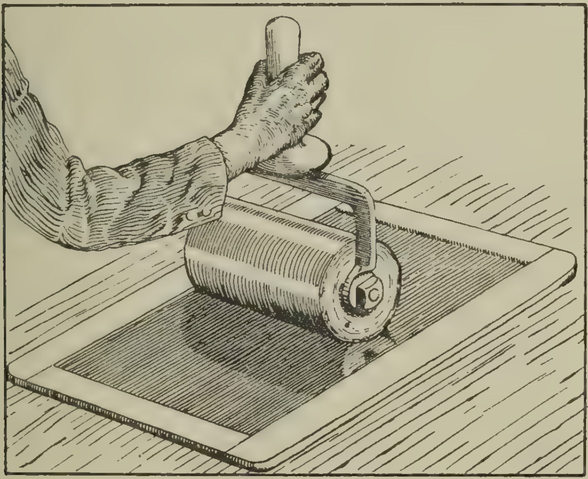


Fig. 45. Rolling up Ink on Plate

Cleaning the Type

Type must always be cleaned after use, or the interstices will be clogged with dried ink. A solvent called lye is used, and the old-fashioned wash was made from pearl-ash and water in the proportion of one pound to a gallon. Another recipe is a pound of potash or even washing soda dissolved in a gallon of soft water. Petrol has been used, but it is too dangerous for children to handle. Paraffin will also serve, but it has so many disadvantages that it is best avoided.

The wooden furniture, reglet, and quoins are removed from the forme. The mass is then tied up, placed on a rough galley specially reserved for the purpose, and fixed with old or discarded quoins. The fixing must not be tight because of swelling.

Place the galley in a shallow tray, pour the lye over the type, and brush lightly with a large stencil brush. A few minutes only are necessary before pouring away the soiled lye and washing the type under a tap. Allow a few minutes for draining, and then slide the type off the galley to a convenient place for complete drying.

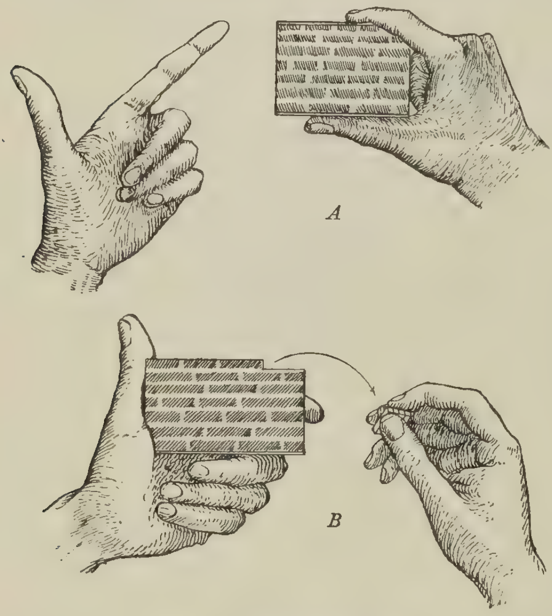


Fig. 46. Distributing Type
A, first stage; *B*, type in left hand ready to be put into boxes.

Distributing

This operation, called dissing by printers, is the act of replacing the separate pieces of type into the correct boxes of the type-case.

The method of the compositor is as follows. The cleaned type is placed on the galley and untied. The various faces are separated and brought together. A few lines are lifted up, as when taking type from the composing-stick, and placed in the left hand as shown in Fig. 46, the first finger stretching along the back.

A piece of lead or rule must be under the bottom line, or the type will 'pie'—*i.e.*, fall to pieces.

This piece is slipped into the type, if not already there, when isolating the portion to be picked up. With the second finger of the right hand the first word from the right is pushed forward from the back and seized by the thumb and first finger. At the same time the word is read, and each letter is rolled forward by the middle and first fingers worked against the pressure of the thumb and placed in its correct division of the type-case. Letters must not be thrown carelessly into the boxes.

The operation appears to be an easy one, but considerable practice is necessary before speed and accuracy are acquired. Surprising speed is attained by skilled craftsmen.

The writer has found the above method to be unreliable with children, and he prefers a slower method which acts as a safeguard against accidental pie-ing.

The cleaned type is slid into a corner of the galley, which can now be placed on the table. A box, or block, is put under the open end of the galley to tilt it at an angle of about 45°, so that it slopes away from the operator.

The type is taken up, word by word, with the left forefinger and thumb. The right forefinger and thumb take the letters, one by one, and drop them into the boxes.

Slower than the professional mode as this may be, it is infinitely surer in the hands of youngsters, and it may save hours of irritating labour in sorting out a pile of pie.

Type Sizes

A comparison between the old system and the point system. A point is $\frac{1}{72}$ in.

Old System		*Points*	*Old System*		*Points*
Great primer	=	18	Bourgeois	=	9
English	=	14	Brevier	=	8
Pica	=	12	Minion	=	7
Small pica	=	11	Nonpareil	=	6
Longprimer	=	10	Pearl	=	5

Estimating Quantity of Type

Divide the number of square inches it contains by 4. The quotient equals the approximate weight in pounds.

CHAPTER VII

The Problem of Illustration

Wood-block Cutting

THAT the problem of illustration has been one of great difficulty is shown by the slow evolution of illustrative printing and the tardy development of the methods of reproduction until the discovery of photography and its application to printing processes.

The problem of letterpress-printing was solved by the invention of movable type, and man's ingenuity needed only to be applied to the perfecting of the process in detail. The principle is the same whether, like Caxton, and many generations of printers since his day, we set our type directly by hand, or whether a linotype or similar machine serves as the medium.

The greater task of reproducing the work of the artist has been attempted through many media, from the wood-block, cut with a knife on the plank, to the modern multicolour processes and photogravure.

The latter methods are unsuitable for ordinary schools, chiefly because of the technical training and long experience which such work demands and the great obstacle of plant and accessories.

In no process does the individual effort of the translator show itself so much as in the earlier, if cruder, methods where the knife is the vehicle of expression ; so this method should appeal to us as best satisfying our educational needs. This art is known as wood-*cutting*, and must not be confused with the process of wood-*engraving*, which is described below.

Recent years have witnessed a vigorous revival of wood-block printing, in which many noted artists have found an attractive medium. It has even secured the attention of the advertising expert, who finds that its crisp, bold lines and masses make a more striking appeal to the eye than the more elaborate methods of reproducing blocks for printing illustrations.

To realize the charming quality and superb craftsmanship of wood-cutting on the plank the reader is directed to a study of the remarkable *Dance of Death*—a series of pictorial initials designed by Holbein and cut (with a knife) by Lutzelburger in 1538. These, with their amazing detail, represent probably the finest example of pure knife-cutting that we have.

Materials

For a description of the most suitable woods used in wood-block cutting see p. 90. If only small pieces are required for use in the press, as for initials, ornaments, and head- and tail-pieces, it is possible to make these from a slab of any sound dry wood faced with pear-wood, which lies at hand in the discarded set-squares of the school. Two 45° set-squares with the hypotenuses meeting will make a square of sufficient size, if glued to a piece of other sound, dry wood, to make many small blocks. The set-squares are usually $\frac{1}{8}$ in. or $\frac{3}{16}$ in. in thickness. Type-height is approximately $\frac{15}{16}$ in., or the diameter of a shilling. The under piece of wood will therefore require to be $\frac{13}{16}$ in. or $\frac{3}{4}$ in. in thickness.

Glue down the pear-wood with thin, hot glue, and leave the block under pressure for twenty-four hours. The pressure is necessary to prevent the edges of the thin wood from curling. Warm the pieces before glueing, especially in cold weather.

When set the upper surface should be first planed if necessary, preferably with an iron smoothing plane and afterward scraped plane true with a cabinet-maker's scraper. To make doubly sure place a piece of 0 sandpaper on a piece of plate-glass, and rub the face of the block gently with a rotatory movement.

Test the thickness of the block with callipers set to a piece of type. It will be well to err on the side of under height than over height, as any shortcomings can be overcome by pasting paper under the block if necessary to bring it type-high. Slight faults in the planity of the surface may be corrected later by make-ready on the press.

In preparing linoleum blocks the depth of the under slab will be governed by the thickness of the lino. Warm the lino, and glue down as before, keeping under pressure till set. Always cover the lino when pressing it with a perfectly flat, smooth piece of wood or, better still, plate-glass ; otherwise the surface will be indented and spoiled.

The reader may suggest that, to prevent warping, the under piece should be built of two thicknesses, with the lie of the grain reversed. In the writer's experience this device has often proved a failure, and it is not so sure as the employment of one piece of well-seasoned timber. The latter method is used by printers, mahogany and birch being the kinds of wood most favoured.

Cherry is usually sold in small thicknesses, so it may be necessary to build it up with other material. Use hard wood if possible, and cross the grain of the two pieces.

A First Experiment

For our first essay in block-cutting let us choose an initial letter which is simple in form, such as *H* or *I* (Fig. 47). Draw the design, in black ink or water-colour, and trace it with waterproof Indian ink on a piece of good tissue-paper. Gum the tracing, *face downward*, on to the prepared surface.

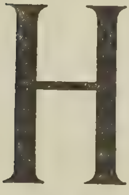


Fig. 47. First Exercise in Block-cutting

Apply gum, not to the paper, but to the block, spreading a thin film evenly with a finger-tip, and, laying the tissue down, cover with a spare sheet and press all over. Unless care is used the tracing will be pulled and the design distorted. The best method is to stretch the tissue on a board and to bring the gummed block down on to it.

The small portion of the block which is required for the letter should not be detached yet, or the block will be difficult to hold while cutting. It is better to work it while it is part of the whole, sawing it away and trimming it when finished.

The cutting cannot be attempted until the gum has set. A detailed description of this process will be found in Chapter IX.

When the letter is completed cut away the portion not required with a fine saw, and trim the edges with a sharp chisel, taking care that the sides are at right angles to the base, as these are to lie side by side with the metal type. As this may be found a delicate task a carpenter's shooting-board, found in every handicraft room, can be used to accomplish it, or recourse can sometimes be had to a wood-trimmer, with which simple machine the problem is easy of solution. The local picture-framer will no doubt spare a few minutes to trim a number of blocks on his machine. The operation is worth a little extra care if the block is to be set up with type, as satisfactory results cannot be achieved without truth in this detail.

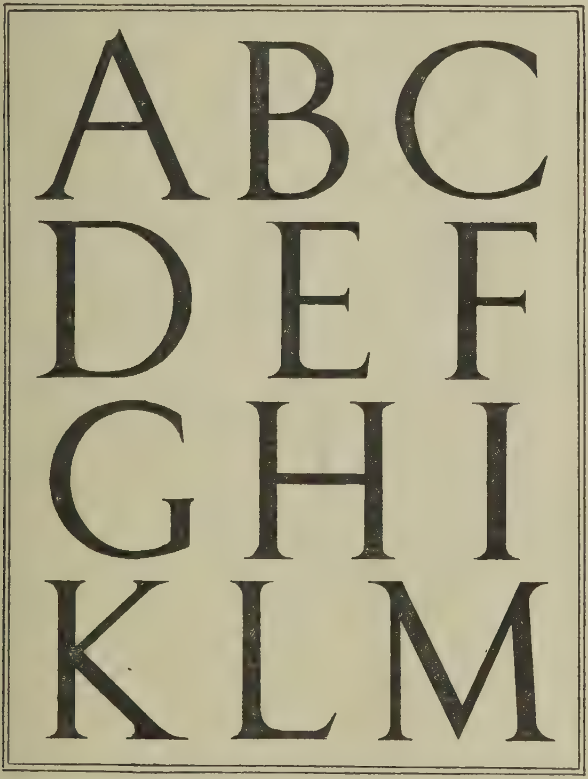


Fig. 48. Roman Capitals designed by Leonardo da Vinci

An alphabet, designed by Leonardo da Vinci, and suitable for initials, is shown in Figs. 48 and 49.

The serifs of these letters will add to the difficulty of cutting them, but sanserif letters are so bald and plain that the extra labour in cutting serifs is amply repaid in the beautiful forms which result.

The children should cut a complete alphabet in letters ¾ in. square, and so add another fount to the equipment.

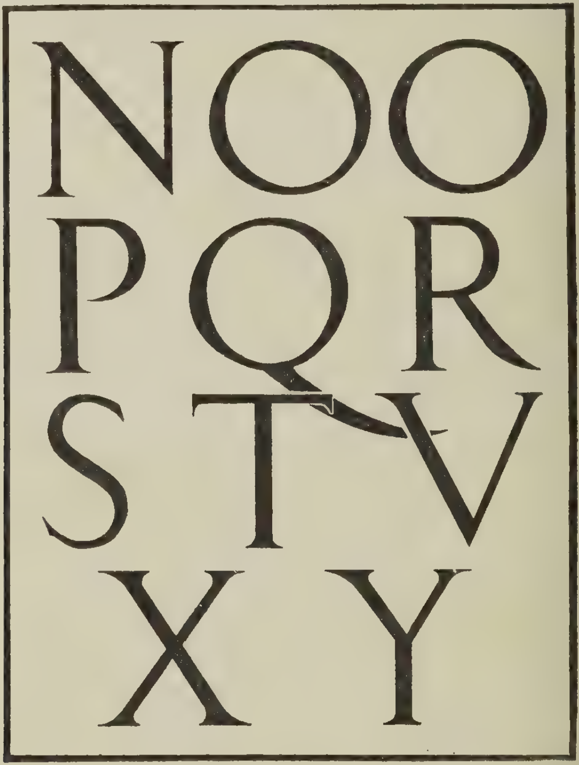


Fig. 49. Roman Capitals designed by Leonardo da Vinci

In addition to plain initials, designs similar to those shown in Figs. 50 and 51, cut in linoleum, are pleasing ornaments, lending considerable dignity and charm to a page, besides offering opportunities for design of a simple but telling character. Woodcuts are shown in Fig. 52. Because of the small space the design must not be intricate. It should need as little cutting as possible, and a few experiments will teach the children that the best results are accomplished where the labour is least.

The tools required for block-cutting are simple and few, being merely one or two knives and a couple of gouges.

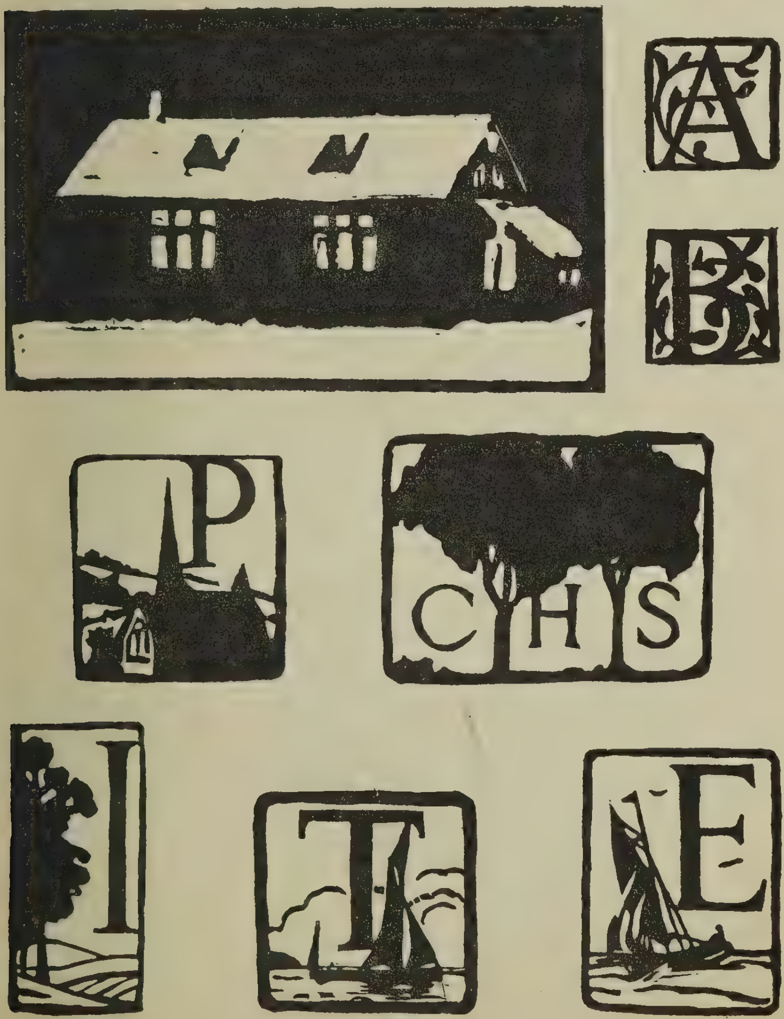


Fig. 50. Initials and Designs cut in Linoleum

Making the Knives

The knives may be obtained from Reeves and Sons, Ltd., or Dryad Handicrafts, at about 1*s*. 6*d*. each, but an excellent tool may easily be made in school.

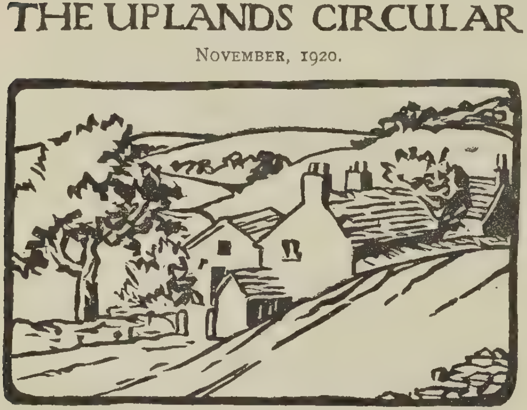


Fig. 51. Magazine Heading cut in Linoleum

A stout steel knitting needle, or knitting pin, not less than $\frac{1}{8}$ in. in thickness, may be obtained at any wool shop; one needle will make two or three blades. Heat one end in a Bunsen burner to a bright red heat, for about one inch of its length, and beat out on a flat piece of iron with a hammer. (Heavy blows will split the steel.) After reheating and beating with care it will assume the shape shown in Fig. 53 (*a*). The forging is allowed to cool slowly—the slower the better—the steel will be softer in consequence.

Shape the blade as shown in (*b*) on a grindstone; if this is not available the surfaces may be rubbed on a large second-cut file placed flat on the desk, much in the same way that a slate pencil used to be pointed. Vigorous rubbing quickly teaches the pupils that friction causes heat, and the fingers may be slightly burned.

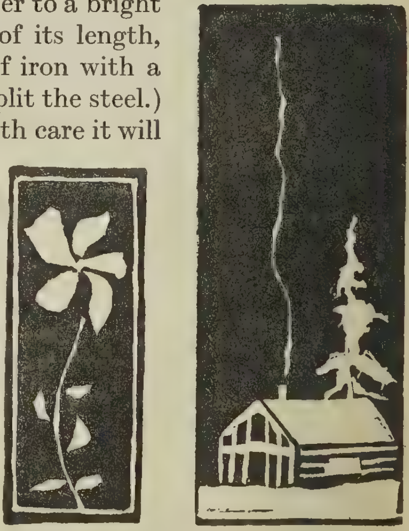


Fig. 52. Woodcut Decorations

Grind or file the cutting-angle (*c*), and polish the flat sides on F emery cloth.

The blade is, however, too soft for use, and requires hardening and tempering. To harden, heat the shaped portion to a dull red heat, *not a bright yellow*, and plunge it quickly into cold water. The steel is now so hard as to be brittle, and needs to be 'let down' or tempered. Polish it again on the emery cloth. Turn the gas down to a small flame, shutting off the air. Then hold the blade about an inch above the flame. By watching carefully you will note the bright steel turning to a pale straw-colour, deepening in tone as the heat travels through it to a dark straw-colour or deep golden hue.

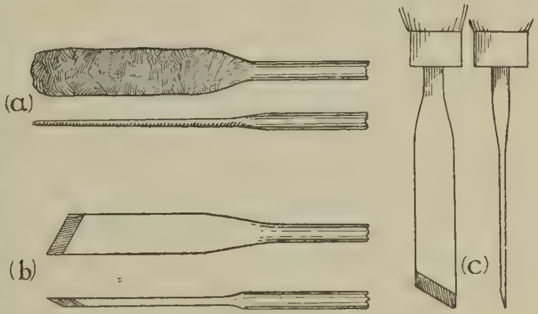


Fig. 53. Making a Block-cutting Knife
(*a*) Needle after forging; (*b*) blade shaped and polished; (*c*) the finished tool

When this colour is reached plunge the knife instantly into cold water or oil, preferably the latter. If held above the flame for a longer period the colour will have become brown, or even purple, and ultimately blue, as is a coiled watch-spring. If chilled at these later stages the knife will be useless, as the edge will bend.

When a number of blades are to be tempered it is easier to heat a flat bar or plate of iron to a heat not greater than that of a smoothing iron. Place the hardened and polished blades on to it, and as they show the correct colour flick them off with a stick into the vessel containing the chilling liquid. The tempering of a large number can be done very quickly by this method.

Mount the blades in small file handles having ferrules, allowing about $1\frac{1}{2}$ in. of the blade to project. Sharpen on an oilstone by rubbing the cutting face until the edge 'bites,' afterward removing the burr by one or two strokes with the back of the blade absolutely flat on the stone. Note that the knife is ground and sharpened *on one side only*.

A $\frac{3}{16}$-in. swan-neck gouge and one or two others of larger size complete the outfit of tools.

Wood-engraving

Wood-engraving is at present very much in vogue, being particularly attractive to advertising agents. So much is its peculiar quality in demand that it has reached the highest pinnacle of flattery—namely, imitation—and many pictorial advertisements are executed in pen and ink which are directly intended to imitate the work of the graver. These are greatly favoured in American magazines, and while a few illustrations are from actual engravings the majority are spurious.

Wood-‘ engraving ’ is a somewhat loosely applied term, and it is frequently used to describe examples which, having been cut with a knife, are not true engravings at all, and should still retain the old title of woodcuts.

Dr Johnson’s definition that “ to engrave is to picture by incisions ” does not help to mark the important difference between the two methods, as we have seen that the incisions may be made with a knife.

Engraving, in the craftsman’s sense, has always been done with a ‘ graver ’ or ‘ burin,’ and, whether the medium is metal or wood, the method is the same. The tool (see Figs. 54 and 55) is pushed along the surface of the plate, cutting out a V-shaped groove at one stroke. The picture is made by cutting these grooves *into* the surface, line by line, roughly parallel to each other. Gradations, or ‘ tints,’ are made by varying the widths of the cuts and the relative spaces between them.

The method of printing depends on the material engraved. *If the engraved plate is of metal* it is well charged with ink and the surface wiped clean with rags. In this manner the surface ink is removed, but the grooves are left full to the edges. A damped sheet of paper, backed with a piece of soft felt (‘ blanket ’) is laid on the plate, and the whole is passed on a metal bed under a heavy metal roller. This forces the paper into the depressions and so into contact with the lines of ink.

These adhere to the paper, and on drying form slightly raised ridges.

Etchings, steel and copper engravings, mezzotints, and aquatints are printed in like manner.

Wood-engravings, however, are printed in the same manner as type—*i.e.*, the *surface* is inked, and from it prints are taken. Pressure is used, as in all printing, but the backing is hard and does not push the paper into the interstices.

Metal-engraving is well called black line, in contrast to white line in wood-engraving; the purpose of the metal-engraver and etcher being to build his picture by *cutting* the black lines to secure his forms and tints, while the wood-engraver seeks to *leave* the black lines of his drawing by cutting the *white* portions away. In other words, it is not the cuts which make the picture in a wood-engraving, but the portions left on the surface —that is to say, in relief.

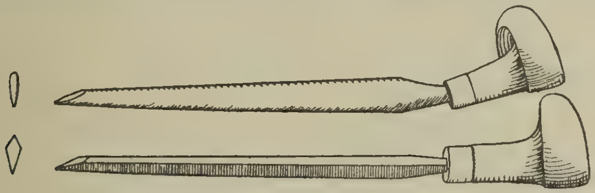


Fig. 54. Wood-engraver's Burins

To Thomas Bewick (1753–1828) must be given the credit for the invention of this method of wood-engraving. Woodcuts had previously been produced on the surface of planks of wood cut the long way of the tree. It is at once apparent that if one takes a graver, a solid piece of steel, and endeavours to cut a clean groove across the grain the broken wood will fray up on each side of the furrow, making a clean cut impossible; although such a line will be clean and sharp when directed along the grain.

Wood-*engraving* can only be done on the *end* of a closely grained timber, boxwood being the material used. Owing to the varied texture of this timber, pieces of over four inches square are difficult to obtain, and larger blocks are built up from smaller portions, using slip-tongues and grooves.

The mechanical accuracy of the plane surface on the end of a tough piece of box removes it from the category of things possible for children to make for themselves. The prepared blocks may be purchased from Messrs Badoureau and Jones, 25 Poppin's Court, Fleet Street, London, W.C. There are two or three grades of quality, but the cheapest is quite satisfactory for school work. The blocks will be found to be planed dead true, and with a delightfully smooth surface, almost metallic in its quality.

Owing to the scarcity of boxwood it is now the practice to use old blocks refaced. These will need packing up to type-height for use in the press.

The blocks are rarely printed from in commercial work, as it is now usual to make an electro from the block.

The Tools

Gravers. These need be only few in number. The first two only in Fig. 55 are gravers proper. They are very similar to those used by metal-engravers, but are more lozenge-shaped and are not so square. 3, 4, and 5 are tint tools, since they are used for cutting tints or shades in which the lines are intended to be nearly parallel or equidistant. The tools 6 and 7 are solid gouges used for clearing out small pieces in spaces between the lines. Three tools, 2, 4 (or 5), and 6 should be ample for general work in school illustration.

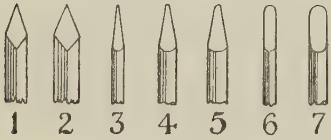


Fig. 55. Shapes of Ends of Gravers

The writer has found gravers procured from a shop to be too long to be handled with comfort, and that those best suited for children's use are the discarded ones of professional engravers. If they must be purchased from a tool-dealer, at least one-third of the blade should be snapped off, and the cutting face reground. The tools will last a lifetime, and so the first cost is the last.

Making the Tools. The gravers can be forged from fine tool-steel obtainable from a good tool-merchant. After forging and grinding, or filing, to shape they need smoothing on fine emery cloth, and polishing, on the under surfaces at least, on an oilstone to ensure a fine cutting edge.

The steel, if too hard to file, should be softened by heating to a bright red and cooling it slowly by burying it in dry sand or powdered lime.

The tempering is described on p. 95, but, as the tool requires to be stiffer and harder than that of the usual wood-cutting tool, the heated steel should be chilled as soon as it shows a pale straw colour.

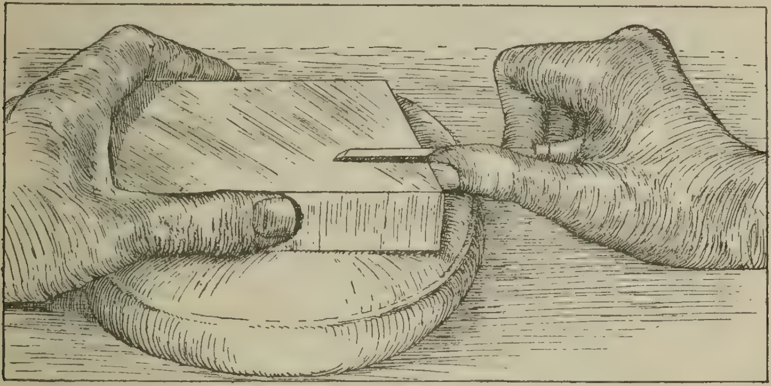


Fig. 56. The Graver in use

Sharpening. Rub the oblique face flat on an oilstone of fine grain, endeavouring to make the surface square across the blade.

When this is done lightly rub the sides (also perfectly flat) on the stone for a stroke or two. Finally draw the under edge gently over the stone to remove the burr and to preserve the shape.

The Sand Bag. This is a leather cushion, stuffed with sand, upon which the block is rested during cutting. It is not indispensable for school work.

The Globe. The engraver's globe, filled with green-tinted water, which is used to concentrate the light upon the portion under operation, is not required unless advanced work is attempted.

The eyeglass, as used by watchmakers, and often by engravers, will not be needed by children.

Fig. 56 will show better than any words how the block and graver are held. The pupil should have worked with a knife as described in Chapter X before attempting to use a graver. He will realize the greater speed of the burin in comparison, and as his object is the same—*i.e.*, cutting a series of V-shaped grooves, he will at once appreciate that where two cuts are necessary to make a groove with a knife, the direct cutting of the furrow with a graver needs only one stroke for the same result. Further, the cut from the graver can be much finer, and the tool is capable of producing lines so delicate as to be impossible of execution with a knife.

Working on the Block

Before one can draw on the surface it is necessary to apply a thin coat of Chinese white, and this is best done with the ball of the thumb. When the wash is dry the design or picture is made with brush or pen, using Indian ink or pencil. The drawing will need to be in reverse on the block.

If the young engraver is unable to draw direct on to the block he can prepare his drawing on paper and trace it through a carbon sheet, remembering, of course, that the design must be reversed on the block.

The drawing, if in pencil, is liable to be smudged, and it is as well to cover the surface of the block with a piece of thin paper lightly secured to the sides with beeswax, tearing away a sufficient portion to expose the part being worked.

The usual practice is to go along both sides of the line required with a fine graver, followed with a coarser one if needed, and finally with a gouge. This method is suitable where there is considerable space between the required lines, but if a tint, or half-tone, is needed this is accomplished by a number of more or less parallel cuts with a tinting tool or fine graver.

Before essaying with a graver upon the choice surface of the planed boxwood one should practise a few strokes on the under side of the block in order to get the feel of what will be a strange tool. A few cuts there will not harm the block. Avoid, at all times, cutting for the sake of cutting. Endeavour to follow the advice of the famous engraver

Arthur Linton, who, in his *Manual of Wood-engraving*, says: "Bear in mind that engraving is only drawing with a graver; the mere mechanism of leaving lines drawn for you, or by you, with pen or pencil any intelligent or careful craftsman can accomplish." And again, "Recollect always that you are *drawing* with your graver, and unmeaning lines of either pencil or graver are not drawing."

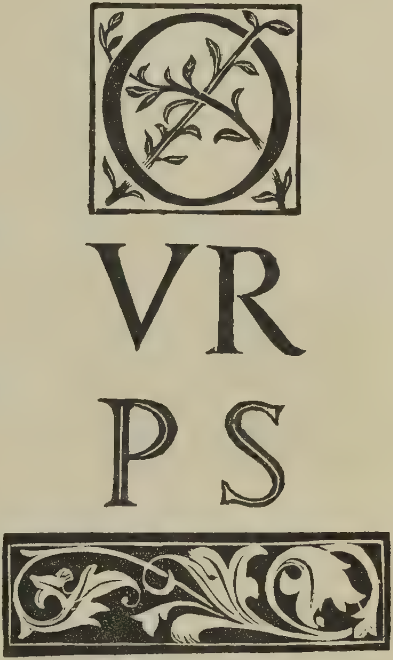


Fig. 57. Blocks produced with a Graver

Taking a Proof. The materials required are India paper, printers' ink, and a ball, burnisher, or paper-knife.

First clean away the pencil marks with india-rubber. Beat out a little ink on a slab with the ball. Take from the slab as little ink as possible, and beat, *very gently*, over the surface of the block, taking great care to keep the ink out of the grooves. Place the India paper in position, covering it with a piece of thin card. Hold the edges firmly and rub the paper-knife, or burnisher, briskly over the whole surface. A corner may be raised to see how the print is faring, and whether further rubbing is necessary.

The print will show what need there is of further work on the block, but such work should not be resumed until the ink is dry. The blackened surface will show the cut lines clearly, provided that the ink has not been plastered on the block.

Considerations of space will not allow of an exhaustive treatment of the subject of wood-engraving, even if the writer were qualified to undertake it. For fuller information the reader is referred to the various works on the subject. Most of these are, unfortunately, out of print, but they can be studied at reference libraries. Sufficient is here indicated, however, to introduce an art which is at once fascinating and extremely valuable as a process in the training of craftsmanship.

The reader is recommended to the study of wood-engraving as it was at its zenith, notably in the illustrated periodicals of the years around 1860. A parcel of wood-engravings can be bought for a few pence, and a number of these may be accumulated to allow of distribution to a class, so that each pupil may enjoy the contemplation of a piece of craft-work which will leave him full of admiration and not a little amazed at the skill of the engraver.

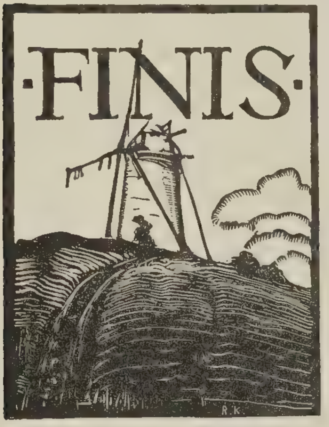


Fig. 58. Engraving, by a Boy of Twelve, slightly reduced

It would be a waste of time to endeavour to emulate the examples of this period: nor is it desirable to do so. The modern revival of the craft approaches the subject from a different angle, and finds expression in a treatment, cruder perhaps and less finished than that of the period mentioned, but more acceptable to present standards than the meticulous care and virtuosity of the earlier days.

The examples of engraving, Fig. 57, are the work of a very capable little fellow of eleven years, the capital *O* being his first attempt.

Fig. 58 shows a more ambitious effort.

Illustrations from Zinc Blocks

So far we have dealt with methods of illustration which call for the exercise of some degree of craftsmanship, and which for this reason are most attractive to us educationally.

There may arise a need for producing illustrations, ornaments, head-pieces, and tail-pieces by some method approximating to modern commercial practice, and zinc-etching, or zincography, is such a process which can be carried out in schools with a minimum of trouble.

The magazine covers *El Proveedor* (Fig. 59) and *Scintillæ* (Fig. 60), and the illustration for an article, *The Tragedy of Mr Punch* (Fig. 61), were produced by this method. These are examples of pupils' work, and, although the *Scintillæ* design is more suitable for a wood or lino block, the examples show the possibilities of the process.

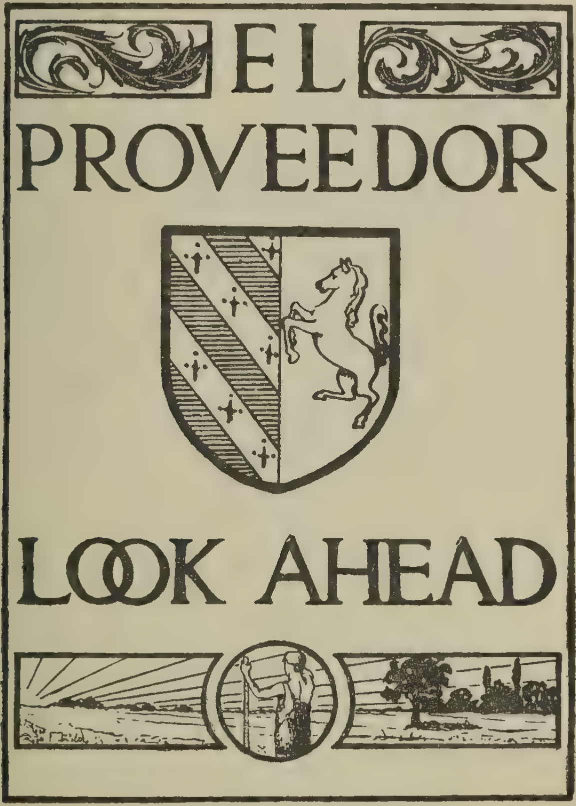


Fig. 59. Zinc Etching

Materials

The materials required are simple in character and few in number.

Zinc Plates. These are bought already prepared, the most

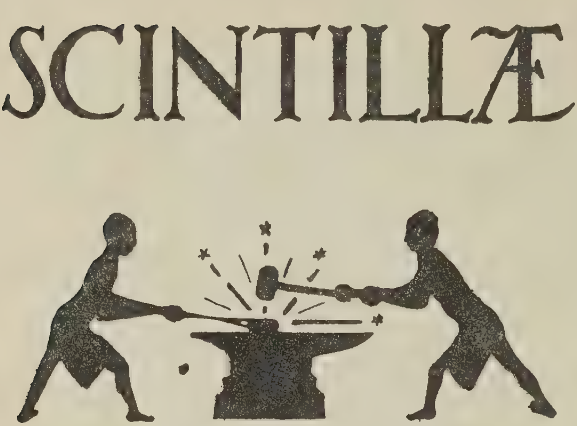


Fig. 60. Zinc Etching

suitable for our purpose being those with a matt or slightly grained surface. Avoid polished plates. Messrs A. W. Penrose and Co., Ltd., 109 Farringdon Road, E.C., will supply small quantities. A suitable size is 4¼ in. by 3¼ in., or, for larger work, 6 in. by 4 in., and these are procurable at about 5*s.* and 9*s.* per dozen respectively.

Lithographic Drawing Ink. This is sold by Messrs Penrose at 1*s.* per stick, and one piece will last a long time.

Dragon's Blood. This romantically named composition is a fine powder of a resinous character. It is as well to point out to the children that its lurid title is derived from its colour merely, and that it has no real connexion with any mythical monster! It cannot be obtained in smaller quantities than a quarter of a

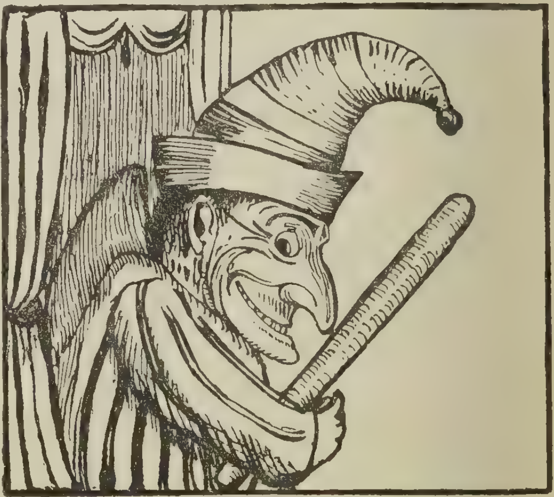


Fig. 61. Zinc Etching: Illustration for "The Tragedy of Mr Punch"

pound, and this will last a long time if kept in a jar with a screw stopper. The cost is 2*s*. 9*d*. for a quarter of a pound.

Gum Arabic. Lump gum arabic dissolved in warm water to the consistency of ordinary bottled gum, or mucilage, is best prepared in school.

Litho Printing Ink (*Black*). This is distinct from the *drawing* ink, and is similar to printers' letterpress ink. It contains more fatty matter.

Litho Varnish. Varnish is used for thinning the litho printing ink. These two can be obtained in small quantities from Messrs Blackwell and Co., Ltd., 7 Dyer's Buildings, Holborn, E.C.1.

Finishing Ink (*Penrose's*). After a few experiments have been made finishing ink will be found to be a necessity for really fine work. Very little is needed, but the price, 3*s*. 6*d*. per lb., makes it a rather expensive item.

Brunswick Black. This familiar varnish will serve instead of finishing ink for our earlier plates. For our purpose it requires to be thinned with turpentine. Reserve special brushes for it, and either wash them out in turps after use or keep them in oil, or an air-tight canister.

Ink Roller. The writer has found it difficult to procure a cheap roller suitable for schools. A photographer's squeegee would do if it were not so hard and if one could be sure it would not have several 'flats,' or, in other words, that it was really round. The best substitute for the professional roller is a squeegee covered with printer's blanket. This is a closely woven white baize, and the small piece wanted should be sought of the local printers. It should be neatly fitted to the roller and the edges carefully sewn, butting together and not overlapping.

Nitric Acid (*Full Strength*). This rather dangerous fluid is best kept out of reach of careless hands, and diluted as required. The diluted acid is not harmful to the fingers. A shallow porcelain or enamelled dish just a little larger than the plates, and a piece of glass, on which the ink is rolled out, complete the outfit.

Method

The process is as follows, and the details should be carefully observed to ensure success.

The tin-foil having been removed, the end of the stick of drawing-ink is rubbed down in a little water (distilled water is preferable) in a paint saucer until a black ink about the consistency of thin cream is made. If the saucer is warmed slightly it will facilitate matters, particularly if the dry stick is rubbed on before the water is added, and stirred with a brush.

With this ink the drawing is made *in reverse* on the plate, using pen or brush. The difficulty of drawing in reverse is not so great if the original design can be done on a fairly transparent paper and reversed on a window pane or on white paper.

A tracing can be put on the plate with carbon paper, but this must be done most carefully as the carbon acts as a ' resist,' and careless work may show on the plate.

The design may be lightly sketched in with pencil without any harmful effect, and pencil lines may be drawn on when lettering is required.

Make the drawing with a full pen using light pressure, and fill in with a fine sable brush. Any slips outside the pattern may be trimmed back with a stencil knife. Make quite certain that there are no exposed spots of the plate where the lines of the design are required.

Now paint the back and edges of the plate with Brunswick black. If any of this varnish gets on to the surface of the plate scrape it away with a knife to expose the surface.

The Bath. Make a bath of a 10 per cent. solution of nitric acid, 4 ounces to a quart of water, and pour sufficient into the dish just to cover the plate. Put the plate in the bath. It will be at once noticed that bubbles begin to rise from the plate where the acid is ' biting.' The design, being protected by the greasy ink, is immune from the action of the acid, but bubbles will be noticed to cling to the edges of the design, and the bath must be rocked to wash these bubbles away.

How long shall we leave the plate in the bath ? As a safe rule allow a first ' bite ' of about two minutes only, or rather less for very fine work. A sure method is to draw a line on some unwanted portion of the plate and test the depth of the first biting on this by feeling it with the finger-nail. As soon as the small step can be felt take the plate from the bath and rinse in fresh water.

Sponge over the surface of the plate with gum arabic, and let the plate lie flat for about five minutes—longer if possible.

In fine etching it is usual to gum the plate at night and to leave it until the following morning.

Now wipe off the gum with a wet sponge. This may seem a curious procedure, and it should be explained that the gum is not completely removed, and the remaining film helps the water to cling to the surface of the plate. Keep the plate wet through the whole of the next stage.

With the squeegee roll out on a slate or piece of plate-glass a little litho printing ink, slightly reduced with litho varnish. The resulting film of ink should be even in depth and well worked out.

Pass the wet sponge over the plate, and taking up the roller pass it, once or twice, up and down the plate. Keep the plate damp all the time. This damping needs a little practice. There should be no excess of moisture—*i.e.*, puddles of water in the interstices are not needed, but the surface should be well damped. Take up more ink on the roller from the ink-slab and run it once or twice across the zinc plate, wiping with the wet sponge between the runs.

The effect of this rolling and damping is to deposit a further layer of ink resist on the required design, and as the rest of the plate is wet the ink will adhere only to the design. Should any ink stick elsewhere it is due to the surface being dry at that spot. This ink must be scraped away and the plate well wetted there.

It will be noticed that the new ink is being deposited on the original drawing ink and that the rest of the plate is quite clean. About six to a dozen passages of the roller will be enough for this roll-up. The requisite pressure on the roller cannot be described—it must be experienced. Press lightly at first, and add weight as you gain confidence. Take up ink from the slab as you need it.

It is possible to pull a proof from the plate at this stage, but it is better to wait a little unless the plate is a trial one and therefore of no value.

Now dry the plate, warming it a little if necessary. At this stage the design is, of course, raised a little from the body of the plate. If put into the acid bath again the *edges* of the design will be bitten into, and a few minutes of this erosive process will be sufficient to undercut the fine lines completely. These will then float off into the bath and thus be lost.

Protecting the Edges. Take a broad sable brush, or, failing this, a camel-hair brush, dip it in the dry dragon's blood, and brush the plate from left to right. Tilt the plate a little during this operation, keeping the left side uppermost. Leave no powder where it is not wanted. Warm the plate, when the blood will melt and cling to the edges. Cool the plate, and repeat the brushing with a fresh supply of powder from right to left, tilting the plate. Warm the plate as before. Cool it again.

Now brush from top to bottom and warm. After allowing the plate to cool give a final brush from bottom to top and heat and melt the powder as before. Hold the plate with pliers when heating, but protect the back and surface with a fold of paper between the jaws. The edges will now be completely protected.

Second Biting. Make a fresh bath of acid of twice the strength of the first. (After a little practice one can strengthen the first bath with the addition of a little raw acid.)

Immerse the plate and rock the dish as before. If the plate is examined through a lens it will be noticed that the section is approximately like Fig. 62, *a*.

This second biting will make another step. Rock the plate in the bath for about five minutes. Change the acid if it is ‘ dead ’ and the plate does not effervesce freely.

Rinse the plate, then gum up and roll up as before. Dry and dust the plate with blood in accordance with the previous practice, repeating the bitings until the desired depth is obtained. This will depend largely on the design and the paper to be printed. If it is an open design with wide spaces, the depth should be about $\frac{1}{16}$ in. at least. If a close design the depth need only be very small. A thick soft paper demands a deeply etched plate, while a thin hard paper will print well from a shallow plate.

Examine the plate, and it will be found that round the protected parts are a series of steps or shoulders formed by the respective bitings (Fig. 62, *b*). Now scrub off all the ink with turps, and make clean with a soft rag.

Warm the plate slightly, and roll up with Penrose's finishing ink, reheating the plate until the ink has melted and dried. This ink should be well laid on so that when the plate is warmed the ink will tend to run over the edges of the design. Place the plate in a fresh bath of acid (same strength as that used for the first biting) so as to allow the shoulders to be bitten away (Fig. 62, *c*). These are apt to print if thick paper is used.

As an alternative to this last rolling-up the design may be painted over with Brunswick black thinned with turpentine applied with a fine brush before the final biting. The black varnish should cover the surface and the edges of the design, and if this is neatly done the plate may be bitten to a considerable depth.

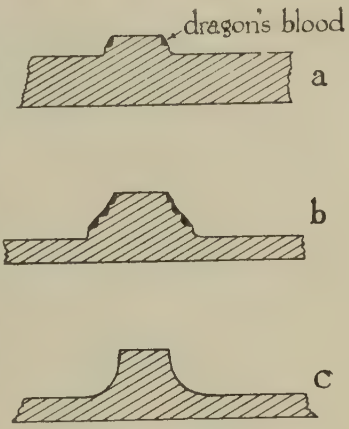


Fig. 62. Sections of Plate showing Bitings

After this final erosion of the unwanted parts the plate may be cleared of any surplus metal with a fret-saw and metal drill. This will be necessary only where there are wide open spaces into which the paper may fall during printing.

A few fine holes are now drilled in the low parts of the plate and it is nailed with short panel-pins to a wood block to raise it to type-height, and so made ready for the press. A graver's scorper or gouge is a handy tool for clearing away any unnecessary parts which show in the printing. Take care not to drive the nails tight or you may buckle the plate. Use a cup-pointed punch as soon as the pin is started, to avoid damaging the plate with the hammer.

The wood for mounting the plates to type-height can be obtained from Penrose's if it cannot be prepared in the school. If too low when tested with the type the block may be raised by pasting paper or thin card underneath. The planing of a small piece of wood to the dead true surface is a difficult task for an expert. It is therefore better to plane a large piece and cut portions from it as required, or to obtain a board machine-planed a little thinner than is needed and pack it up with paper.

From the above description it might appear that the process is complicated and difficult, but actually it is simple enough and most fascinating. The finished plate is practically indestructible in use, and for permanent work—magazine covers, head- and tail-pieces, and ornaments generally—it is particularly suitable.

Summary

For convenience we can summarize the process in the following steps :

1. Draw on the plate with lithographic drawing ink rubbed up in distilled water.
2. Protect the back and edges of the plate with spirit varnish or Brunswick black.
3. Give first biting in a 10 per cent. solution of nitric acid. Rock the dish and bite till a slight step, which can *just* be detected with the finger-nail, has formed round the edges.
4. Rinse the plate under the tap.
5. Sponge with gum and allow to stand for at least five minutes.
6. Wipe off gum with wet sponge. Keep plate wet.
7. Roll up with lithographic printing ink thinned with litho varnish. Sponge plate continually.
8. Take a proof if wanted now, but do not strip off the protecting ink with too much pressure. If it should come off it can be replaced with the roller with care or with a brush charged with litho drawing ink.
9. Dry the plate.
10. Dust with dragon's blood (*a*) from left to right, (*b*) from

right to left, (*c*) from top to bottom, (*d*) from bottom to top. After each of these four operations warm plate till blood melts.

11. Place plate in bath of double strength (20 per cent.). Rock as before. Keep in bath till nearly all shoulder has disappeared.

12. Rinse the plate. Gum up and roll up again as from 5, and repeat the process until desired depth is obtained.

13. Scrub off all ink, etc., with turpentine.

14. Warm plate slightly, and roll up with finishing ink. Heat the plate till this ink melts over the edges. Or, paint over the design carefully with Brunswick black thinned with turpentine.

15. Place plate in bath of same strength as first biting, until shoulders or steps are removed.

16. Cut away superfluous metal, drill holes in sunken part of plate, and nail to block.

Note. When warming the plate hold it over a Bunsen burner or gas ring. It should be held some distance above the flame and moved about so that the blood is melted over the whole surface. As this occurs the colour turns from red to black.

CHAPTER VIII

Stencilling

THE familiar and simple process of imposing a design by means of a perforated plate of thin, non-absorbent material is an important aspect of printing by simple means. Space will not allow of an extensive treatment of this delightful craft, and it is included here only as an additional solution of the problem of illustration. For this purpose it is extremely suitable for schools, and although slower as a process than printing it is a useful accessory, and at times, when speed and quantity are not considerations, it may be preferred.

It is an art of infinite subtlety, and in the hands of the Japanese, for whose delicate sense of decoration it has provided a vast field, it has reached a degree of beauty unequalled in the West.

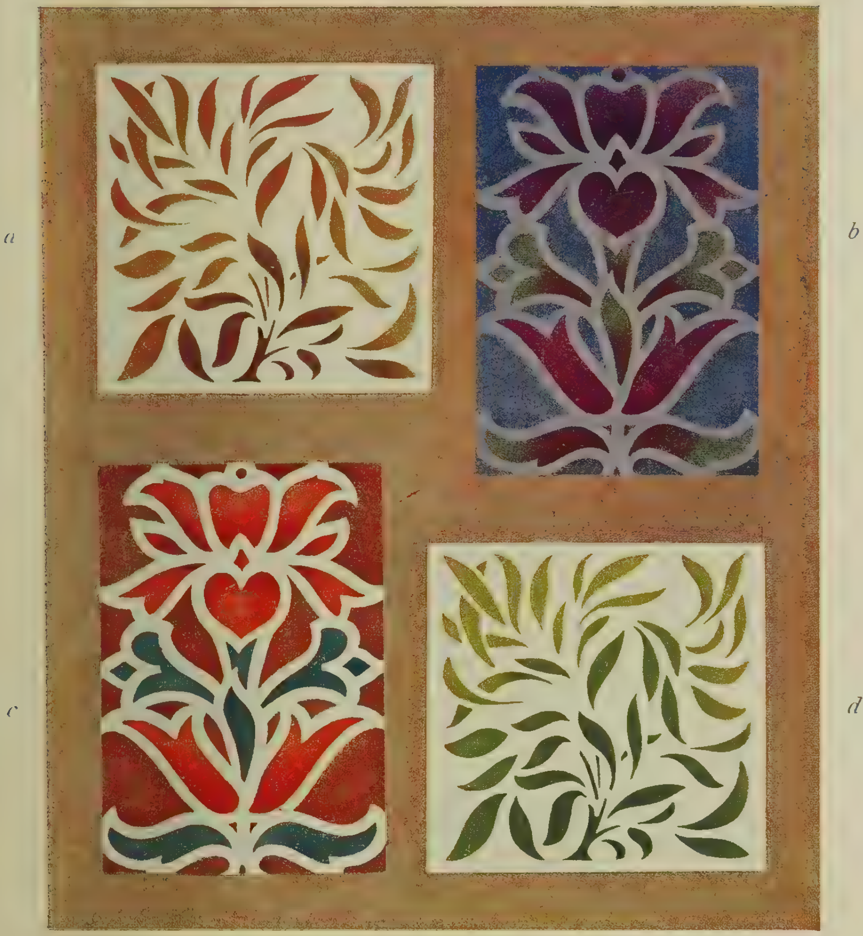
The peculiarities and limitations of design in relation to process must be appreciated thoroughly before complete success can be achieved. The preparation of the design, the cutting of the stencil plate, the application and blending of the colours, all call for a degree of craftsmanship which makes the process one of intense interest.

Stencilling may be used for illustration, the decoration of pages, the ornamenting of book-covers, and the embellishment of various articles of craft-work. It is one of the cheapest forms of handicraft for schools, and it offers wide facilities in the training of colour-values and art-forms, contributing to the discipline of hand and eye in a manner probably equal to that afforded by any art process.

Materials

The materials are of the simplest in character : a knife, some suitable paper or thin metal, stencil brushes and colours, and a piece of sheet glass are all that are needed.

PLATE III



Stencil Plates

(*a*) A freely cut conventional stencil plate designed to fill a rectangular space.

(*b*) A stencil on a tinted ground. The ties are the dominant feature of the design. The key, or tie stencil, is cut first, and the blue ground, crimson, and green plates are cut from it.

(*c*) The same, on a white ground and with other colours.

(*d*) As *a*, but with other shades of colour.

The Knife. (See Fig. 63.) This is made by the children from a half of an ordinary steel knitting-needle mounted in the separated halves of a lead pencil. Beat out the point as is described for the making of a lino knife on p. 95, and file or grind to shape. Polish the blade on emery cloth, and harden and temper as directed. The cutting edge is sharpened from both sides. To counteract the tendency of the point to turn over and so form a burr which will tear the paper, bevel it as shown in Fig. 64.

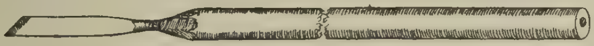


Fig. 63. The Finished Knife

To prepare the handle, boil a cheap lead pencil for a few minutes to soften the glue ; the halves will then easily separate. The pencil is taken out, and, when the wood is dry, the unforged portion of the knife is inserted, the two halves being then glued together again. Tie with string at the ends and middle until the glue has set, or leave in a vice over night. If the needle is too thick to fit the grooves the handle should be bound with thin twine or stout thread. The binding should be neatly done, and the skill of any Boy Scouts who may be in the class should be enlisted in finishing it off like a bat handle, or in the same way that a rope-end is whipped.

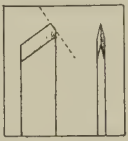


Fig. 64. The Cutting Edge

The method of securing the cord is shown in the sketch (Fig. 65), *A* being the loose end and *B* being the loop which is drawn taut and under the binding, so pulling *A* with it.

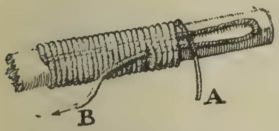


Fig. 65. Whipping a Handle

For advanced pupils the binding can be done with a few turns of copper electrical wire at intervals, while these are held taut a bead of solder being run into the turns with an iron.

Paper. Paper for stencil-plates must be tough, about the thickness of notepaper, non-absorbent, and smooth on one side at least. Manilla paper as used for commercial envelopes is as serviceable as any for general work. Many papers could be specified, but as the majority of teachers have to use whatever material is available any paper which has the above qualities will serve.

Special stencil paper can be purchased ; it is oily in appearance, and semi-transparent, and does not need to be proofed. Cartridge and brown papers are good for large work, but are not satisfactory for fine cutting. Nothing equals the Japanese stencil paper, which is fibrous in texture and very strong.

If the paper is not waterproof it should be brushed over on both sides with boiled linseed oil thinned with a little turpentine. This makes the paper semi-transparent—a valuable quality at times—but as it requires a few days to dry a stock should be prepared in advance. Gold size, thinned with turpentine, dries more quickly, but it is not so clear. For immediate use the best dressing is painters' ' knotting,' which is a coarse French polish, or good French polish—shellac dissolved in methylated spirit—if it is available.

This dressing toughens the paper, and it can be applied with advantage before the design is cut.

The writer has often used ordinary foolscap paper without any dressing. If the brushes are comparatively dry when applying the colour there is little fear of absorption.

Drawing

This should be made first in pencil, and blocked in with Indian ink.

The features of a stencil design lies in the disposition of the ties or bars which secure the otherwise separated portions to the body of the plate. As these form so essential a part of the design they should not be inserted haphazard or merely in convenient places, but should be considered as an integral part of the whole pattern. Fig. 66 shows a conventional design and its arrangement as a stencil.

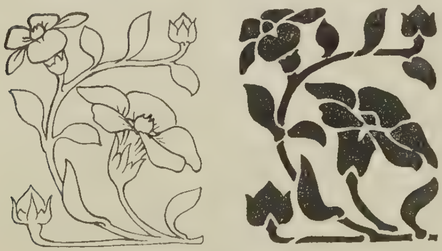


Fig. 66. Drawing and Stencil

A good practice is to complete the design in black ink, as if for a printing block or a silhouette, and to try the effect of the ties in various positions by indicating them with white chalk. These may be painted in with Chinese white, and the design is then ready for cutting. Plate I shows a four-plate stencil in which the ties are made the feature of the design.

Proof the paper if it has not been done already. The ties, if well placed and drawn as delicately as is practicable, will add to, rather than detract from, a design. If they are too large or too frequent they tend to break up the pattern into a series of coloured spaces with little or no relation to each other, whereas with careful disposition they will give a continuity to the design.

Cutting

Lay the paper on a slab of glass or zinc, preferably the former. Very little pressure should be exerted on the knife. Keep it in a vertical plane, but inclined slightly in the direction of the cut to avoid tearing the paper. Use the knife as the Japanese do, the right hand merely guiding, the left driving. Holding the knife in the right hand as if it were a pen, insert the point and push at the back of the blade, as near the point as possible, with the tips of the middle finger of the left hand.

As a general rule cut the smaller spaces first, carrying the knife well into the corners. A clean corner is ensured if the two cuts overlap a little, but care is needed to avoid cutting the ties. If these should be broken they can be replaced by thin strips of paper. If they are glued or gummed in place the moisture from the brush will detach them. The only satisfactory adhesive is knotting or waterproof glue.

To cut small circles is a trying task, and they are best done with a saddler's leather-punch. With a small selection of these punches formal designs of great variety can be easily accomplished, and such punctured patterns may serve as a stimulus to pupils incapable of invention in free design.

Metal Stencils

If durability is required, or if a stencil is to be in continual use, it should be made of thin sheet zinc or brass—paper brass as it is called—and cut with an engraver's burin. Stouter material is cut with mallet and chisel or gouge, and finished with a file.

Japanese stencils are frequently of so delicate and elaborate a pattern that they are reinforced with a network of human hair or silk threads. These do not show in the print. Several plates of thin paper are cut at the same time, and these are stuck together with proofing solution in pairs, with the hair or silk between.

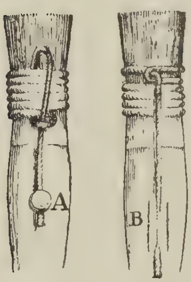


Fig. 67. 'Bridling' the Brushes

Brushes

Stencil brushes are so familiar as not to require description. Usually it will be found best to 'bridle' the bristles, as is done by decorators; otherwise they spread with use, and passing under the edges of the plate destroy the clean, sharp edge of colour. Or the bristles may be shortened by dabbing the tip of the brush on a hot metal plate.

Bridling. The sketch (Fig. 67) shows two sides of a bridled brush, the loose ends being pulled tight and secured by driving a tack through at *A*, or by pressing the point of a penknife into the wood as at *B*. The string is pushed into this with a blunt tool and two more cuts with the penknife are made at each side, so closing the wood over the string. This is helped if the wood is wetted afterward.

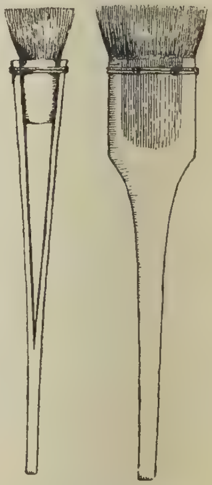


Fig. 68. Japanese Stencil Brushes

Japanese Stencil Brushes. These (see Fig. 68) are of a design peculiarly their own. They are not expensive, but they are not so serviceable as our usual pattern, and do not last long if used for dabbing. They are intended to be brushed over the pattern.

Colours

For black a handy form is the solid black stencil ink in round tins, as sold by commercial stationers. It should be noted that the different makes vary in quality, some being rather gritty. A good quality is quite smooth in texture.

Ordinary student's water-colours are excellent for school work if care is used to avoid excess of moisture. Do not *dip* the brush into a vessel of water. The writer has found that the most satisfactory method is to have a small piece of board, proofed cardboard, or stout paper, on which a few drops of water are sprinkled. Take up one or two of these drops on the brush and then a little colour ; work the brush round on a piece of waste-paper and it will be found just right for application. A very little practice will establish the correct degree of moisture.

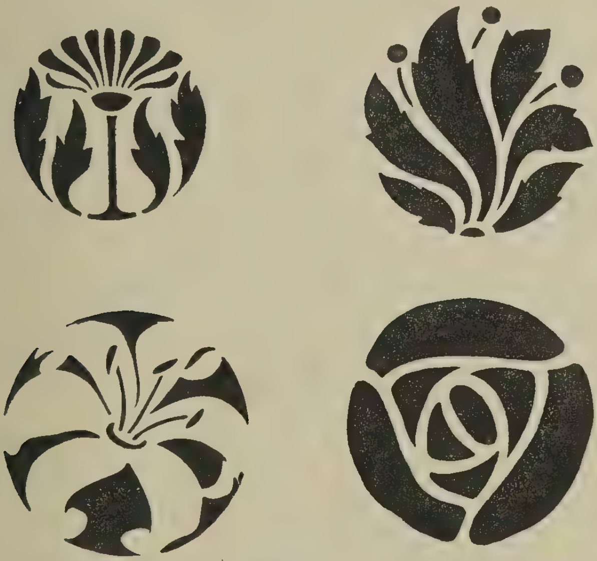


Fig. 69. Examples of Stencils of Circular Outline

With children it is always advisable to test the brush of colour on a piece of waste material before applying to the stencil plate.

If much of a colour is likely to be used sufficient should be mixed to the right consistency in a dish. Of this a small quantity should be placed on a piece of non-absorbent material, to be picked up with the brush as required and distributed evenly on the bristles by rubbing with a circular movement.

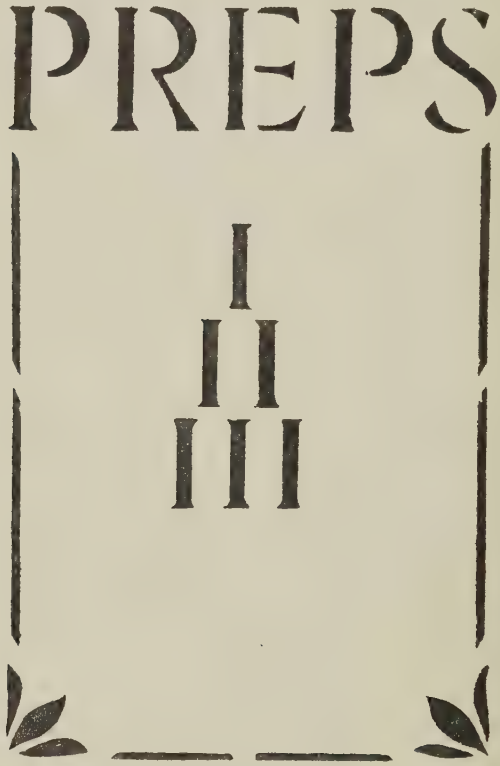


Fig. 70. Stencilled Magazine Cover

Applying the Colour

When all is ready the stencil plate is secured in position with drawing-pins or clips. The colour is applied by dabbing the brush gently over the spaces of the pattern. Sharp edges to the print will be obtained by lightly brushing the colour on with a rotary movement, or, better still, by following the edges of the larger spaces.

The blending of one colour into another, the gradation of a colour from intensity of tone to a delicate transparency, are fascinating operations which are quickly accomplished, providing the brushes are used *nearly dry.*

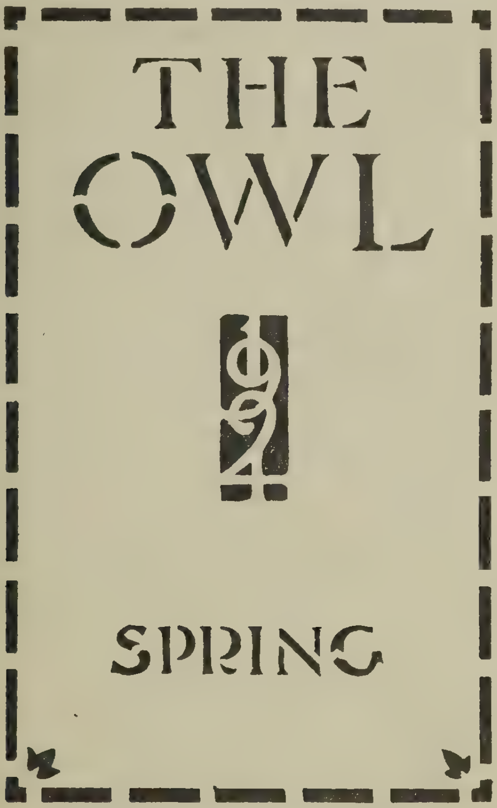


Fig. 71. Stencilled Magazine Cover

A pallid print, or one that fails to stand out from the background, can be improved to a great extent by going over the extremities of the design, before removing the plate, with a brush containing the merest suspicion of moisture and a trace of black or grey.

Large Designs

Tempera colours are most suitable for broad work, posters, decorations, etc., on account of their opaqueness.

Dry pigment, obtainable from oil and colour shops, is mixed with a thin solution of gelatine or gum. Half an ounce of this should be added to sixteen ounces of warm water, so that the whole has the consistency of syrup.

For finer work use white of egg with a few drops of vinegar and an equal quantity of cold water. A little white should always be added to give 'body' to the colour. For large work finely powdered whiting is used.

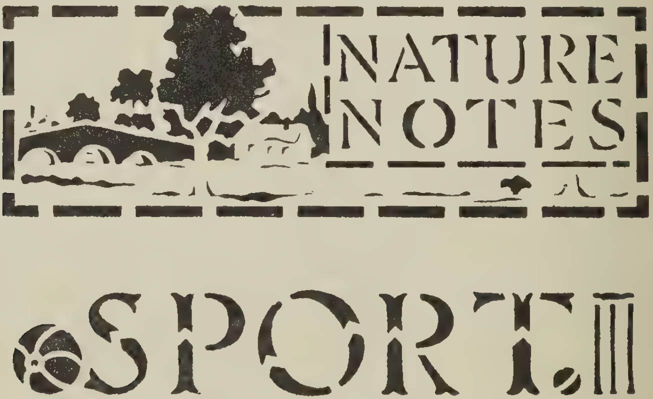


Fig. 72. Stencilled Page-headings

Mixed colours should always be tried on a scrap of the material and allowed to dry, as owing to the added white the tint dries much paler than the mixture.

Oil-colours cannot be used on paper or anything of an absorbent nature unless it has been proofed beforehand. They are absolutely permanent, and are more brilliant than tempera colours.

They are slow in drying, but this may be hastened by adding a little gold size to the colour.

Stencilling with powder colours on a paper with a 'grip,' such as pastel paper, gives wonderfully soft effects, but it will not stand handling. Used for suggestions of backgrounds it is most effective.

Water-colours when used on clean wood are improved by a rub of wax polish.

Stencilling on Fabrics

See the account of stick-printing on fabrics given in Chapter XII for directions concerning the preparation of colours.

Secure the stencil plate and the material to a board with drawing-pins and use the brush almost dry.

The examples in Fig. 69 show simple stencils of circular form.

Figs. 70 and 71 are magazine covers, in the latter of which the centre device " 1924 " and the lower corner ornaments were done in bright colour.

Fig. 72 shows two stencilled page-headings, and Fig. 73 is one of those examples which are produced when the "teacher isn't looking."

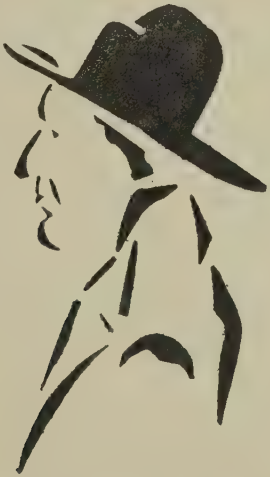


Fig. 73. Stencilled Design

CHAPTER IX

Block-cutting and Printing

Description of the Process

BLOCK-CUTTING and printing, especially when linoleum is used, is a fascinating occupation for children, and as a form of handwork it is perhaps unsurpassed. The quality of attraction affects not only the child-mind, for adults fall just as quickly under the spell, and the art can count among its votaries many of our best artists.

As a preface to the more mechanical art of the printer it has great significance, for in it we have that art reduced to the simplest possible terms. We have seen that it was from wood-block printing that letterpress-printing originated, but it is not for this historical reason that we include it here.

It has its own educational values as an artistic craft, and these, to be fully appreciated and enjoyed, should be experienced through practice in the craft even though the exercises be but elementary.

Little extension of these simple steps is needed to reach a point where really artistic work can be done, as shown by the remarkable success in this field of activity by the pupils of Professor Cižek at his school in Vienna.

The materials are of the simplest, and can always be available, so that work in a class-room may be interrupted and resumed at any convenient time.

It is essentially a craft where self-expression soon becomes evident, and after a few formal exercises wherein the pupil learns to appreciate the possibilities and the limitations of his medium he should be encouraged to work without direction.

If the designs are to be used in the printing-press the blocks will need to be raised to type-height, as described in Chapter VII, but we are concerned here only with the cutting of the block and printing by hand-rubbing in the Japanese manner.

Block-cutting and Printing

Materials

Linoleum. There are so many qualities of linoleum that a word on selection may be useful here. Buy scraps of the best possible material from a good furnishing house. For a few shillings the writer has bought cuttings of excellent stuff sufficient to last a large class for a year's work.

The thickness is best at about ⅛ in.; if thicker it is, as a rule, spongy, and this is a disadvantage. If less in thickness the underlying canvas is often cut with the knife, and the projecting threads foul the printing.

Choose lino with a smooth face. The older linos were full of cork, which gave a rather rough surface. The best modern material has a face almost as smooth as glass. If the surface is not too rough it can be sand-papered smooth, but this is much slower and more trying than would appear. Should the surface be pitted with almost invisible roller-marks the lino must be discarded as useless for the present purpose.

Lino with a *printed* pattern is of no use, but inlaid lino is quite suitable although rather hard and inclined to be gritty.

Cheap linoleum is gritty, and blunts the knife at a stroke. The best will be found to " cut like cheese," holding up firmly to the knife so that the parings detach with a delightfully clean, sharp edge.

When cutting up the material for a class do not attempt to cut it with a knife as a shoemaker cuts leather, but score the surface with the point of a sharp knife along a straight-edge. Bend the sheet backward, and it will crack along the line so that the canvas can easily be cut, preferably from the back (Fig. 74).

Wood. The most suitable woods for block-cutting are those which have a fairly straight grain and, though close in texture, are not too tough. Wild cherry is ideal, and is closely followed by pear, lime, and apple. American whitewood, not the basswood sometimes sold under that name, has been used, but it cannot be recommended except for broad work. It is rather porous, and it does not stand up to the knife as well as the closer timbers. Cherry is close in texture, smooth in grain, and is of a pale reddish colour. It is rather difficult to obtain, especially in wide boards, but a few firms, however, stock a small quantity. The surface of the plank must be planed true and scraped with a joiner's or cabinet-maker's scraper, but not sand-papered, as this fills the grain with grits, besides making the wood 'furry.' To prevent the boards warping they must have battens or cross-pieces securely fastened across the grain at both ends. Both sides of the wood may be used, and the battens should stand up on each side to protect the surface from friction on the table.

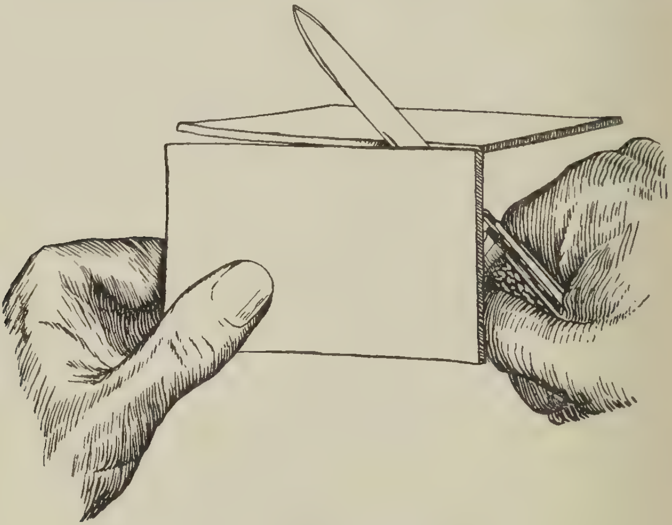


Fig. 74. Cutting the Linoleum

Knives. The block-cutter's knife is shown in Fig. 75. The blade is loose, lying in a slot, and can be reversed for carrying. The ferrule slides off, and being of slightly conical shape it holds the blade in position when pressed home. It will be noticed that the blade is sharpened only from one side, the back being quite flat.

Another knife, or, more correctly, a small chisel, is used by advanced block-cutters (Fig. 76). These are extremely handy for fine work ; they are made with blades of varying widths.

Both of these tools can be made by scholars from knittingneedles, as described in Chapter VII, but they will have to be fixed in small file-handles.

A small swan-neck gouge, $\frac{3}{16}$ in. wide, should be available for each pupil if possible, or, if not, one should be shared between two. A few larger, 'firmer' gouges will also be useful occasionally.

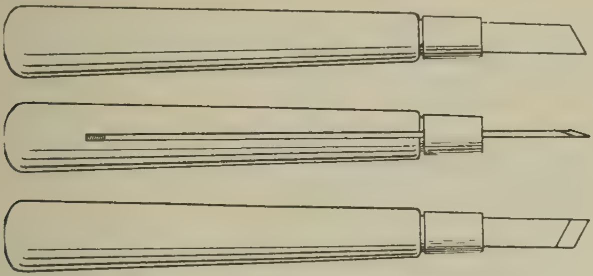


Fig. 75. Three Views of a Block-cutter's Knife

A small mallet may be needed with the gouges for wood blocks when clearing large spaces.

Colours. Student's tube-colours are excellent and handy for class-work, but for work of the highest quality use powdered dry colours mixed with rice paste, or artist's quality of water-colours, with a little rice paste added to give brilliancy. Gloy makes an excellent substitute for rice paste.

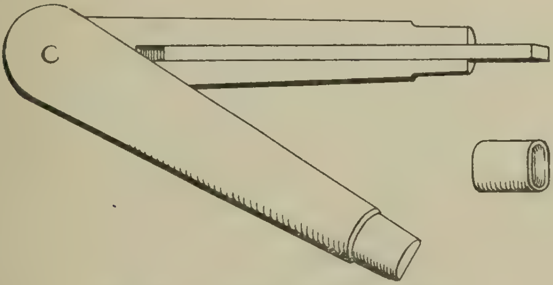


Fig. 76. A Block-cutter's Chisel

Paper. Ordinary duplicating paper (which is absorbent) is most suitable for schools. Any smooth-surfaced, absorbent paper will serve, and even blotting-paper can be used successfully with care. Japanese mulberry paper is unequalled for fine work. It is also fairly cheap, and easily obtained from artists' colourmen.

Brushes. Ordinary stencil brushes, of assorted sizes, cannot be excelled for class-work. Larger brushes can be obtained as the work advances. Messrs Reeves and Sons, Ltd., and Dryad Handicrafts stock these and other materials.

Scrubbers or Barens. Japanese bamboo-sheath barens are too expensive for schools, but good scrubbers can be made from blocks of cork covered with canvas. The blocks are obtainable from tool-dealers, and are quite cheap.

For leather scrubbers see p. 33. Practically anything which, without being hard (as wood), can carry a ribbed material on the surface will serve. The back of cheap linoleum is quite good, and if glued with the lino face to thin wood or thick card makes a good tool, particularly if a flexible handle is added.

Let the children improvise scrubbers after showing them what is required. Their suggestions are frequently surprising, but often effective.

First Exercises

Before attempting any serious work a few experiments should be made on scraps of material.

For very young children the writer has found a suitable first exercise in cutting a piece of lino, or indiarubber, into a small disk and fixing it with seccotine to the end of a piece of pencil. It may be roughly cut to shape, fixed, and trimmed to the curve of the pencil afterward. If rubber is used it will cut better when wetted. This stamp is used for the marking or printing of a set of dominoes, which are cut from stout white card. Ivory black is spread on small pieces of card or saucers and served out to groups who have previously decided which numbers each will print. The dividing-line on each blank may be measured and ruled in by the printers. The stamps need not be circular; they can, with advantage, be square, but more care is needed in placing. To obtain regularity of the lines of dots pencil lines can be ruled, but this is a tedious task for little fingers. The dominoes may afterward be glued to oblong pieces of strip wood to make them 'real,' and they can be used for arithmetic lessons. The end of the pencil itself will also serve the same purpose, and it has the advantage of needing no preparation.

For the initial attempt at block-cutting take a simple pattern such as a conventional leaf, and cut it in linoleum (Fig. 77). The drawing may be made in ink or pencil directly on the surface.

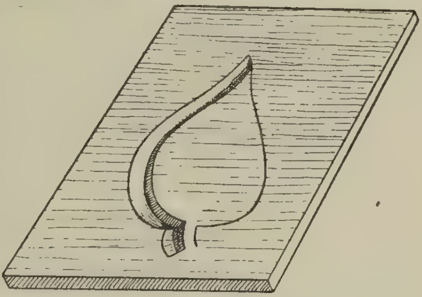


Fig. 77. Cutting round Pattern with Knife

The knife is held and guided by the right hand, with the thumb resting on the top of the handle, the driving force being supplied by the tip of the second finger of the left hand, applied at the lowest point of the blade (Fig. 78). Many children, finding that this right-hand grip cramps the movement of the hand somewhat, prefer to hold the knife much as they do a pen.

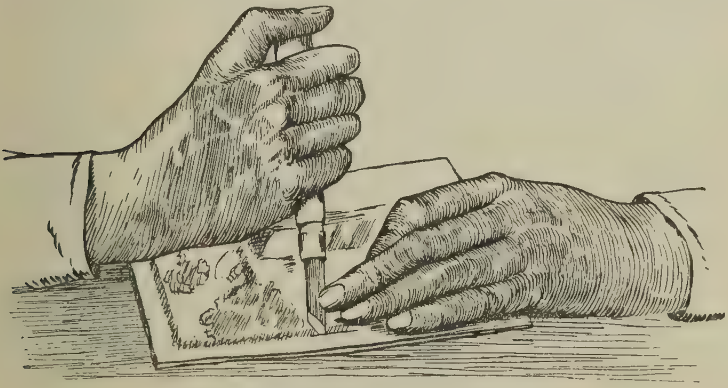


Fig. 78. Cutting with Block-knife

There is no objection to this when one is cutting linoleum, but the former method is essential when working in wood. A piece of rubber tubing or rubber band wound round the blade will prevent the end of the finger from becoming sore with the continual pressure. The flat side of the knife is kept toward the operator and against the line to be cut.

Suppose that a start is made at the stalk-end of the design. The point is then inserted to a depth of about $\frac{1}{16}$ in. or a little more, the blade slanting at from 60° to 80°, and *not* vertical. Pressure from the left hand drives the knife forward, and the right hand keeps the cutting edge to the track.

Avoid pressing the knife-point deeper into the material. Finish the cut at the end of the leaf. The block is now turned round so that the operator is facing the cut just completed, and a second 'clearing' cut is made with the knife held slanting as before, the result of the two cuts being a V-shaped trench along the outline of the design, a narrow string of lino being detached as at *a*. (See Fig. 79.) The trench is continued round the remaining portion of the design.

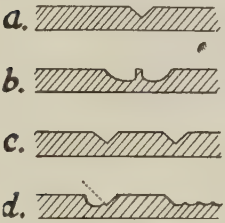


Fig. 79. Lino Sections

If the knife is held upright the effect will be at once apparent when a line is included in the design. The sides will be as shown in Fig. 79 *b*, and this piece will collapse under pressure. Also, when making the clearing cut the knife is often pushed too far forward, and such a portion would be cut away.

The surrounding portion needs to be cleared away with gouges, first cutting alongside the trench with a $\frac{3}{16}$ in. swan-necked gouge, and using a larger and flatter one on the wide portions (Fig. 79, *c* and *d*).

Hold the gouge in the right hand, place the first or second finger of the left hand on the straight portion of the blade, about an inch from the edge, and, gently rocking the gouge from side to side, press forward. This will give more control than if the gouge is pushed in the ordinary way (Fig. 80).

Testing the Cutting

When the block has been cleared a test print can be taken by covering the surface with a thin film of water-colour, laying on a piece of damp duplicating paper, covering with a dry piece of smooth paper, and rubbing with a scrubber which has had a little grease smeared on the surface. The Japanese wipe the scrubber on the hair, which usually holds sufficient oil to supply the necessary lubrication. The youngsters will delight in this process if it is shown to them. The damp paper will have taken a crude print of the design.

A few experimental cuts and prints of this kind will establish the qualities of design most suited to the process.

Elaborate patterns, delicate lines, and multitudinous details will quickly be discarded in favour of bold outline and strong masses of well-related black and white.

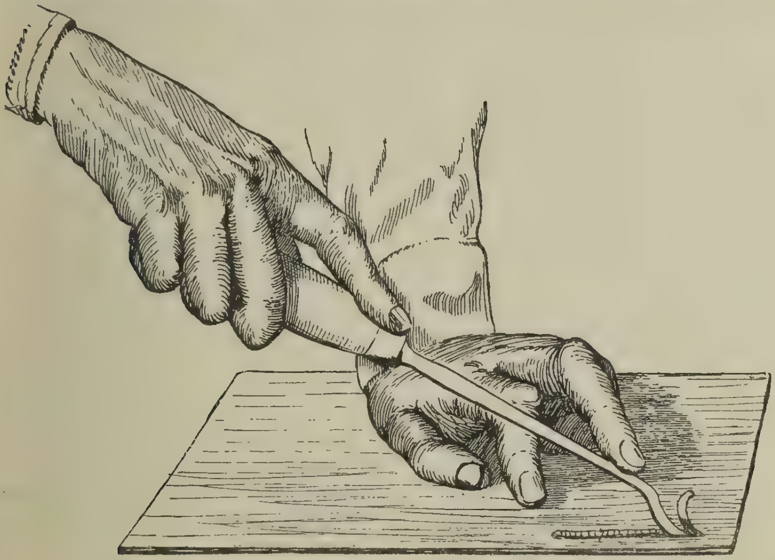


Fig. 80. Trenching with Gouge

Initial Plates

For the next adventure the writer has found that a cypher of the pupil's initials, to be used as a book-label, or a minor sort of book-plate, is very attractive, and it will offer problems of not too great a difficulty.

A few examples are shown in Plate II, and these may serve to show the standard which may be expected of boys and girls aged from ten to fourteen.

Avoid the usual monograms of flowery capitals interwoven so dexterously as to be indecipherable. It is presumed, at this point, that the pupils are familiar with well-proportioned Roman letters. Show the class a few typical examples on the blackboard, using line letters to determine the disposition, and filling in afterward to complete the design.

The designed letters should be circumscribed by a border, which will give a dignity and solidity to the mass. This is imperative if a colour block for the background is to be used.

The designs will be drawn in pencil on paper and inked in solid; in fact they must be finished just as the finished print is to appear.

Now trace the pattern from the paper on to good tissue paper with pen or brush and Indian ink as described in Chapter VII. Many tissues are absorbent and useless for this purpose, so it is well to test the paper before purchase. The Japanese tissue is a beautiful material, almost transparent and of a pale golden tint. It can usually be obtained from artists' materials dealers or from Messrs Aitken Dott and Son, 26 South Castle Street, Edinburgh.

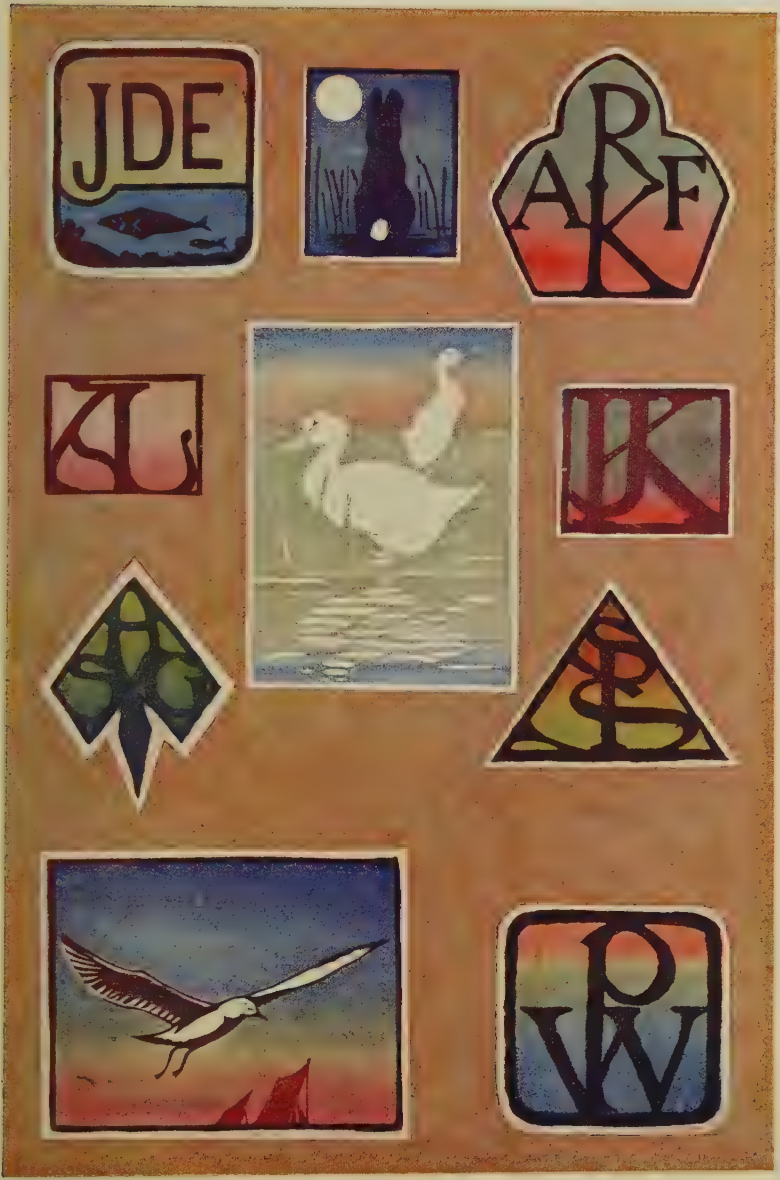
The tracing is gummed down, *always face downward*, and so reversed. Then when dry the block is cut and cleared as described above. Tell the pupils to cut away all 'white' portions, but to be sure to leave all the blacks standing. If the design does not show clearly through the paper smear a trace of oil over the parts to be worked on. Avoid oiling it with an excess of grease, or the tissue will peel off before the knife.

If a plain black (or other suitable colour) and white print is required we can print without further ado.

Cut a number of pieces of typewriting paper or mulberry paper to a convenient size—a little larger than the whole block. One side of this paper is smoother than the other; call this the face side.

Damp one piece with a sponge. Place it, face downward, on a piece of wood or, better still, glass, and on it lay two pieces of dry paper, also face downward. Continue with another damp sheet and two dry ones alternately until the pile is completed, and then leave it to stand between two boards for a few hours, until

PLATE IV



Linoleum Prints

the whole of the pieces are evenly charged with moisture. If the print is wanted in a hurry, and usually these things are, the pile can be put under pressure in a vice or a press, but the best results are achieved when the pile is damped overnight. It is better to err on the side of over-dampness than to have the paper too dry.

Printing—Register-marks

The block may be printed from as it is, but the papers will not all take the print in the same place, and to accomplish this register-marks are necessary (Fig. 81).

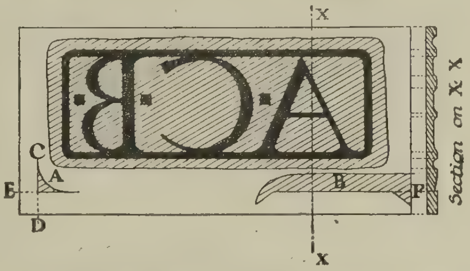


Fig. 81. Key-block with Register-niches cut out

At any convenient point *A*, outside the frame, cut with a knife and ruler a shallow line *CD*, holding the knife vertically.

From *E* to *F* cut (vertically) a line at right angles to *CD*. With the knife held at a low angle cut a slope toward these lines so that the register-niches appear as in Figs. 81 and 82, *A* and *B*.

Into these niches the left corner and lower edge respectively of the paper will be placed when printing.

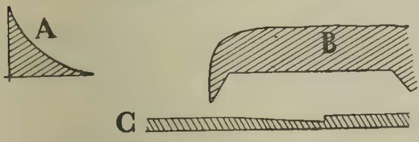


Fig. 82. The Register-niches

A and B are full size. C, section through niche.

It will be noticed, on reference to Fig 81, that the whole of the surface of the block is not taken away when the design is being cut. A groove with the small gouge round the frame is all that is necessary, as the prints will be trimmed almost to the edge of the frame after printing. There should therefore be ample room on the block for the register-niches.

Applying the Colour

For black nothing is so handy in schools as small tins of solid stencil ink. The colour is easily picked up with a moist brush, and spreads evenly on the block; it prints a jet black, and in the tins it is clean in use, is always available, and entails no washing of dishes. Choose a good quality, free from grit, before purchasing. A small tin will last for months. Ivory black, in tubes, is good, but messy.

With a stencil brush spread a coat of colour all over the block. Take up a sheet from the pile of damped papers, using both thumbs and second fingers, the forefingers being extended under the sheet. Place the lower left-hand corner and lower edge respectively in the register-niches. While keeping the lower edge down with the thumbs withdraw the fingers, and allow the paper to fall into position. Put a larger piece of non-absorbent paper over it (foolscap will do, but greaseproof paper or waxed stencil paper is better), and rub briskly with the baren in the right hand, the tips of the left fingers holding the covering paper in place. One corner of the print paper can be turned back for lifting, and this may now be raised to see if the rubbing has been sufficient. Quick strokes rather than heavy ones are best. If everything is right the print will be satisfactory. If unequal in quality it may be due (*a*) to insufficient pressure, (*b*) to the colour being too dry or too thin, or (*c*) to the fact that the paper was too dry.

A very little practice will show the right proportions, and bring about that intimate relation between worker and material which is the basis of all good craftsmanship.

Coloured Backgrounds

Take on dry tissue paper a print in black of the whole block, now called the key-block or line block, *including* the register-niches. Gum this print face down on to another piece of lino, or a better plan is to have a piece of material large enough to take both blocks, so keeping them in one sheet.

This colour block will require but little labour. Only the register-niches need be cut, and a trench round the portion enclosed by the frame on the key-block. In these examples the colour print will be taken first, and the key-block (the initials and frame) printed on the top of this. We shall not need to cut away on the colour block those portions underlying the letters of the key-block, as would have to be done in more advanced work.

Do not cut the colour block to the inside edge of the print of the frame, as a slight error may make it too small to fill the space when printed. Better leave it a little larger, so that the frame printing over it will cover the edges. Any excess can be removed after a trial print.

After the register-niches for the colour block have been cut the combined block will appear as in Fig. 83. Wash away the tissue paper from the lower block, and we are ready for printing.

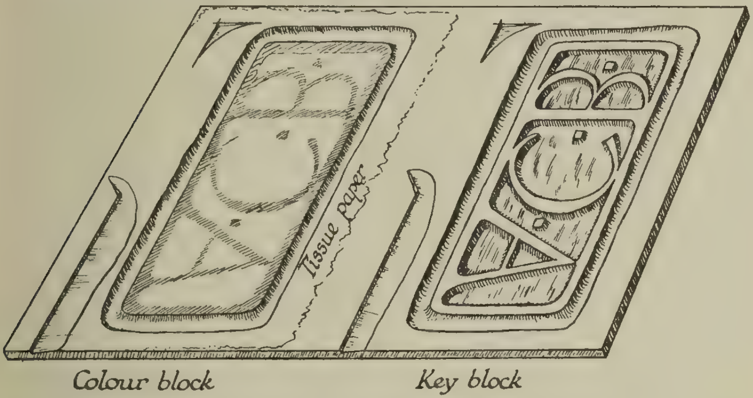


Fig. 83. Combined Block ready for Printing

Printing

With a clean brush, wetted and then squeezed as dry as possible between the fingers, moisten the surface of the colour block. Pick up a little colour with the brush, and spread it lightly over the surface. Two colours may be blended by spreading the lighter colour horizontally over the upper part, starting at the upper edge and working downward past the middle. With a darker colour work in the same way from the lower edge, lightening the pressure as the upper colour is reached. With a little practice the two colours will merge into one another with perfect gradation.

The same result can be accomplished more quickly by using a wide brush. Moisten the brush a little, and dip the two ends respectively into the separate colours. The brush is now worked across the block until the correct gradation is obtained.

If the colour print is not satisfactory spread another wash of colour over the block, and print it again. Very pleasing results may often be obtained by this method when the blending on the block has not been successful, but the paper must fall again into the same position on the block.

Print without delay as soon as the colour is spread. The damp paper is laid on as described above, covered, rubbed, and lifted off. If several prints are being done, they should be placed in a pile. The black print may be taken immediately on top of the colour, as the paper has absorbed it and there is no fear of offsetting. Nor is there any danger of the colours being transferred while the prints are in the pile. If a quantity is being printed take all the colour-prints first and then turn to the key-block.

In some examples it may be better to print the key-block before the colour block or blocks. Both methods should be tried.

The papers must be kept damp throughout the operation, and it is advisable to have a couple of pieces of blotting-paper, thoroughly damped, one to go underneath the pile, the other on the top. Change the colours as frequently as may be desired, but wipe the old colour out of the grooves before applying the new.

A Few Hints for Class-work

Lay out on a long table or bench, or on various desks in the class-room, a number of triple-division dishes with a distinct primary colour in each division, say, orange chrome, crimson lake, and cobalt or ultramarine. Another would hold gamboge, vermilion, and Prussian blue (a very powerful colour). Emerald green tint, purple, and a brown or chrome yellow, may go in another. Allow the children to try, when convenient, as many combinations as possible.

Some, after a few experiments in colour-blending, will adopt a definite colour-scheme for their book-labels, a few even preferring a single tint as the distinguishing colour to indicate readily their ownership. Others, more adventurous, will make futuristic designs with a dab of every colour obtainable. These jazz effects are often joyous things, and should not be discouraged, because an accidental juxtaposition will often show a valuable example of the luminosity given to one colour by the presence of another.

Messrs Reeves and Sons, Ltd., have recently introduced tubes of special lino-printing colours in the three primaries and black. These are most satisfactory, and can be recommended.

Keep a small vessel of water near each palette, and also a few scraps of paper on which to test the colours. If there is a risk of the furniture being soiled spread old newspapers about.

In warm weather the damp sheets dry very quickly unless protected by wet blotting-paper. Children will often take a few pieces, spread them out, and find them too dry when printing. It is best to have a few ‘ central depots ’ from which the papers can be taken as required.

Burnt sienna and Prussian blue are effective as key-block colours as a variation from black.

Book-plates

A more ambitious step will be the designing of a book-plate.

Again, a few examples may be shown to the class, accompanied by a talk on the meaning and need of book-plates. Point out that the book-plate was considered a necessity by every bibliophile, and that many of these plates were cut in copper from designs by prominent artists, and in consequence were very expensive luxuries. Show that the designs were usually of some personal character, and that coats of arms were the prevailing fashion ; that these have very largely been replaced by designs of a more or less symbolical form or by those with a purely æsthetic appeal by reason of the beauty of their composition.

As the purpose of a book-plate is to indicate the ownership of a book the name should be our first consideration.

“ Ex Libris,” “ His Book,” “ Her Book,” “ Hys Booke,” are the only variations of the title that should be allowed.

Complicated designs in the lettering should be excluded, and the pupil will be advised to use only good Roman letters. A suitable size for a book-plate is about four inches by three.

Try to obtain from each pupil a design which has some personal significance. A play on the name, a suggestion of the native town or county, or a simple idea of the owner's hobbies or tastes will often lead to a design which is particularly fitting. For instance, George Fisher will probably copy a well-known advertisement wherein a fisherman is carrying a huge codfish; or he may content himself with a simple idea of a rod and a creel. Another will use the coat of arms of his or her native town. The chemistry enthusiast will incorporate a flask and retort; the model-yachtsman will be sure to include a boat in his design; and the hopelessly inartistic can always fall back on stars, swastikas, and similar formal designs which require little or no invention.

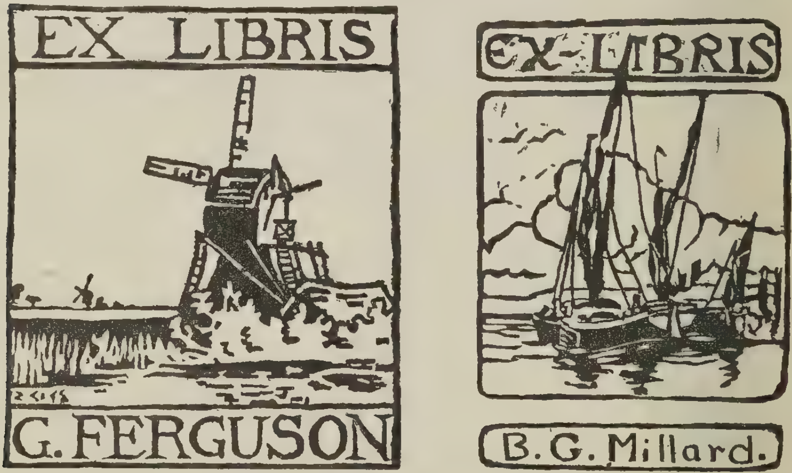


Fig. 84. Examples of Book-plates

Some may collect a sprig of small leaves, and arrange a drawing of this to fill the space; or a simple flower may serve the same purpose.

Severe editing on the part of the teacher is often necessary to exclude impossible designs, although some little experience in cutting will usually temper the spirits of the adventurous. Aim at simplicity and good massing, and consequently at that elusive quality which is best described as rhythm.

A study of *Composition* by Arthur W. Dow (Doubleday Page and Co., New York)—an invaluable work in this connexion—is advised. This book is probably too expensive to requisition on school lists, but most libraries have copies.

Advertisement hoardings are a fruitful source of inspiration, and a collection of posters, or even postage stamps, especially the modern foreign issues, will furnish many suggestions.

Examples of book-plates are given in Fig. 84.

Print the book-plates by hand as described above. If they are to be printed on superior paper the blocks can be made type-high (see Chapter VII) and printed in the press.

Take care in this matter of building up or grey places will appear in the print, and these will need some work on the make-ready.

Maps

Further work in block-cutting and printing lies in the making of outline maps which are afterward coloured by hand.

Only dry colours, pastels, or crayons can be used on absorbent paper, so that if the colours are to be washed in with brushes the outline must be printed on cartridge or foolscap paper. This can be done by hand-rubbing, as described above if the papers are damped, but if this is not convenient use printers' ink on the block instead of water-colour.

A better way is to tint the required patches from separate colour blocks.

Make a key-block (with register-marks) of the outline and also the boundary lines dividing various territories. From this take a print on stout tissue paper for each separate colour required, and paste on to lino as previously described. Do not omit the register-marks on these prints. Indicate the portion required by a wash of that particular colour.

Two patches of different colour which are touching obviously cannot be printed from the same block and a separate block will be needed for each, but if the portions are sufficiently isolated from each other two or three colours may easily be printed from one block, the appearance of which will suggest a number of flat islands each encircled by a shallow trench about ¾ in. wide, the remainder of the block being left standing.

Any boundary lines not now required may be cut out of the key-block, and, with a little care, the coloured spaces will print with their meeting edges touching in perfect register. Some trimming will be necessary to accomplish this.

If many maps are required print them co-operatively—one boy being responsible for each block. In this way a large number can be printed in a very short time.

The same method will be used in producing more elaborate colour prints, for, after all, any colour print is but a series of islands of different colours which have been brought into correct register with one another.

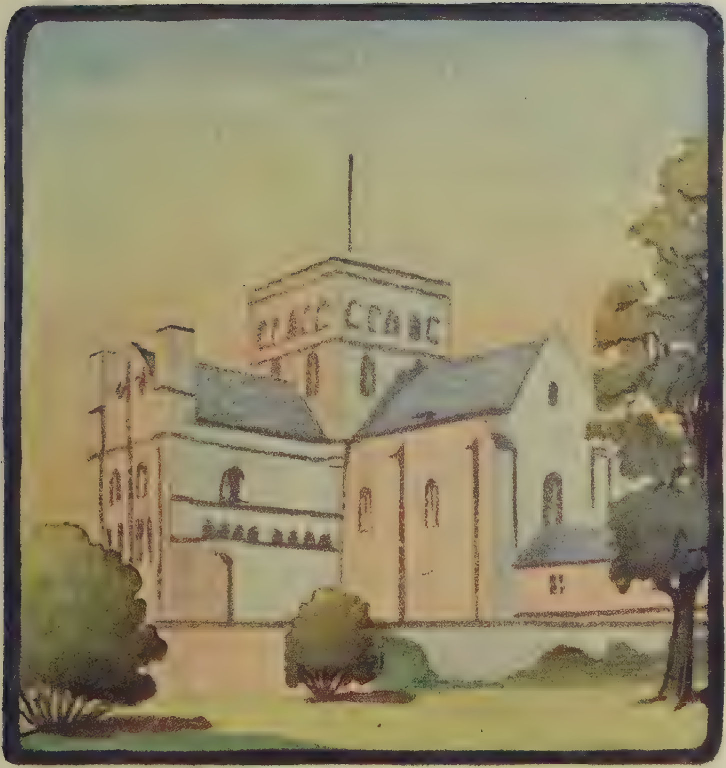
Always make the key-block first, and, having cut the register-niches cleanly (using a steel ruler as a guide), take prints on tissue paper of the whole surface of the block. When these are carefully gummed down, without distortion, to the succeeding blocks you have a number of exact replicas of the surface of the key, and on these the colour-patches will be cut. Correct register is only a matter of careful cutting, but even then discrepancies will creep in, and to correct these it may be necessary to alter the register-niches a little.

Colour-printing

By the time the pupils have made a few successful experiments with simple blocks they will be anxious to produce something in the nature of a picture. Such a project will entail some study of advertisements and posters. The many excellent examples on the hoardings and elsewhere will be a fount of suggestion.

The teacher's greatest difficulty will be to limit the aspirations of the pupils in the matter of design and to confine them to as few blocks as possible. So much can be done on the blocks by gradation and by separation of different colours that the need for a multitude of blocks is non-existent. Again, the problem

PLATE V



A Linoleum Block-print from Six Blocks
St Cross Hospital, Winchester

for the pupil will be to secure the maximum effect with the minimum of cutting.

An example of this is shown in the print of the sea-gull (Plate II).

This is a print from two blocks, these being shown in Fig. 85. It will be noticed that the key-block includes the fishing-boat, although that is of a different colour. This portion may be coloured at the same time as the key-block, or it may be printed separately. The lower line of the key-block border, which passes across the lower part of the boat, is painted on the block with a small brush, the rest of the block being brushed over with a stencil brush. The distant sea-gull is wiped with the tip of the finger just before the print is taken. The graduated sky may be worked up with a single large brush or with two smaller ones, as described in the printing of the initial blocks. Considerable variation of effect is possible here.

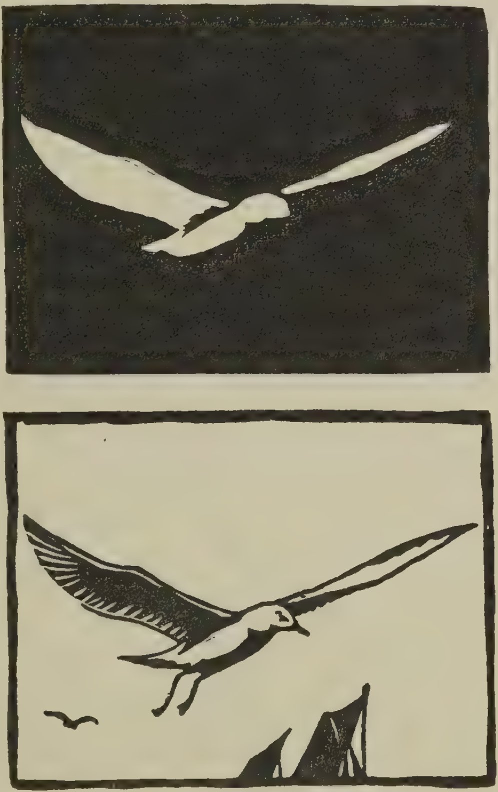


Fig. 85. Blocks for Colour-print

The print of the two ducks is from a single block, that of the rabbit from two blocks.

These prints are not included here as admirable examples of the art, but they will serve to indicate the possibilities of the process in the hands of children with no more than the usual amount of art-instruction.

A further example (Plate V) is shown to illustrate a print from a number of blocks. This, because of the rather delicate variation of tones, has necessitated no fewer than six blocks. The problem of registration was rather an acute one, but it was overcome to a great extent by first cutting the portions on all blocks but the key-block rather large. A print in black, on duplicating paper, was then taken from the key-block and the print placed in the register-niches of the second block and well rubbed down. When the paper was raised a fairly sharp impression of the key-block was left, and the edges of the masses were trimmed to this. A similar print was taken of the completed second block and impressed in the same way on to the third block which was then trimmed to correspond, and so on, until all the blocks were apparently in register. Then a ' run through ' print was taken of all the blocks in order and final corrections made.

Wood-block Printing

The method of cutting and printing from wood blocks is practically the same as described above for linoleum blocks. The boards (of cherry) are best about $\frac{5}{8}$ in. thick.

The cutting is carried out as described above, but a mallet will be necessary when clearing the large spaces with a gouge. Before printing, the surface should be well damped with a sponge, and it must be kept moist throughout.

A wash of rice paste or gloy is advisable before laying any colour. This helps to fill the grain, and so prevents the colour being absorbed.

The edges of upstanding portions which are not to be printed should be rounded off with a chisel and glass-paper to prevent them from cutting the paper during an impression. While linoleum is constant in its quality, it will be found that prints from wood improve as the work proceeds. The correct amount of moisture on the brush will be found difficult to gauge at first. Perhaps the best method is to soak the brushes before use, and then to squeeze them as dry as possible in a cloth or dry sponge.

To add more moisture sprinkle a few drops on a board or dish, and pick these up with the brush as required.

To moisten a wide brush dip the finger in water and make a ‘river’ across the board. If the brush is drawn across this it will be found just right for the next wash.

To realize the charm of the art of block-printing and its possibilities when handled by master-craftsmen, the reader should inspect the folios in the Print Room of the Victoria and Albert Museum at South Kensington. Here also he will find exhibited many of the finest examples of work by modern British artists.

CHAPTER X

Bookbinding

The Importance of the Subject

THE art of bookbinding is one of fascination and refinement, making, in its higher branches, considerable demands upon the craftsman.

The importance of the subject has fully justified the many text-books that have been written about it, but it is hoped that this small contribution may help to remove some of the difficulties which have confronted the teacher who is desirous of introducing it to his pupils, and that it may, at the same time, lead to an increased appreciation of the art.

As the scheme of the present manual endeavours to make possible the production of a printed reader within the restricted sphere of a class-room the binding of the book must be included in its scope. The educational idea that the need should furnish the purpose provides us with a justification for beginning the practice of bookbinding with young children. The acquisitive desires of children respond at once to the task of making "a notebook of my own," such an object having a special (if mysterious) appeal to the child-mind. We cannot make a better start.

Preliminary Exercises

The familiar Christmas card will serve for our first exercise, a square sheet of plain paper being folded as shown (Fig. 86), and sewn through the back with coloured silk or worsted, this being tied in a bow at the back. Cut the top with an improvised paper-knife.

If desired the book may be decorated simply, and used as a greeting card.

For the second exercise a strip of plain foolscap, cartridge, or pastel paper as required, 2½ in. to 3 in. wide, is neatly folded into equal divisions (Fig. 87). Elder children will measure and rule the divisions; young children will divide by folding.

The backs are pieces of stouter paper attached by paste, a strip of waste paper being slipped into the first fold to protect the inner leaves while pasting the outer surface, which is pressed and rubbed down on to the cover.

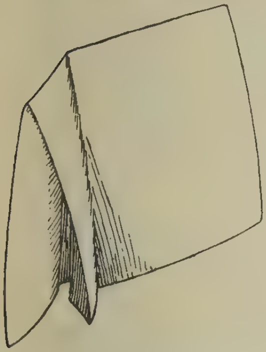


Fig. 86. The First Exercise

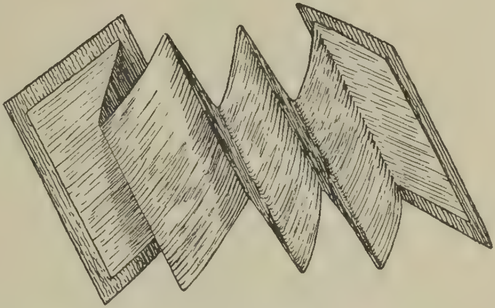


Fig. 87. Simple Exercise in Folding and Pasting

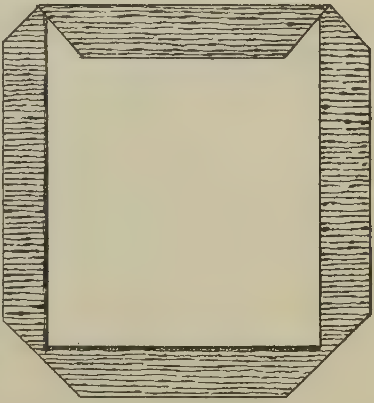


Fig. 88. Covering the Boards

For additional work make the backs of thin card, and cover with coloured paper. This is done before attaching to the leaf strip. Lay the card, reversed, on the coloured paper. Paste the card, turn it over, and press in position. Cut the corners as shown in Fig. 88. Paste a portion about $\frac{3}{4}$ in. wide round the edge of the card, leaving the middle dry. Pull the paper over, top and bottom first, sides last. Press the whole under clean paper.

The covers may be stencilled with a very simple repeat design, or they may bear the maker's name. Such decoration is best done before attaching. The interior will be used for all manner of 'notes' dear to children.

Simple as it may seem, books were once made in this manner, and the advantage of the modern book is apparent by comparison.

Following this exercise a number of sheets may be sewn into a stiffer cover, as a more elaborate Christmas card. The material for the leaves may be ruled foolscap, pastel paper, or cartridge paper, according to the use for which the book is intended.

The better plan would be to alternate the various papers, making the sheets of exercise-book size. These notebooks will be a record of the pupil's work in various subjects, and when sufficient are accumulated they may be bound into a volume, as is shown above. Sewing should be done with bookbinders' thread. (See Fig. 89.)

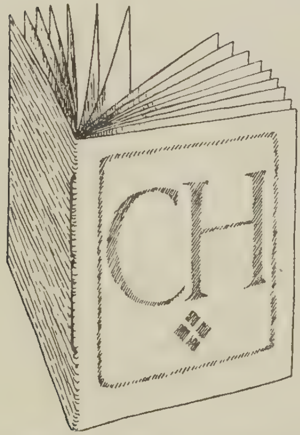


Fig. 89. A Small Notebook

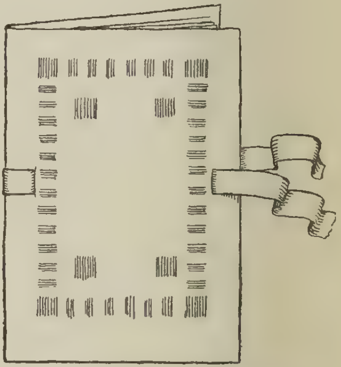


Fig. 90. Cover laced with Ribbon

Exercise books for drawing in pastel, interleaved with tissue paper, and for writing will be made in this manner. Girls may slip a ribbon or tape through the cover as shown in Fig. 90.

Autograph Albums

Cut as many sheets of good paper, 8 in. by 4 in., as are required. With a $\frac{1}{8}$-in. or $\frac{3}{16}$-in. leather-punch make holes in the sheets at one end, $\frac{3}{8}$ in. from the end and $\frac{3}{4}$ in. from top and bottom. To avoid errors, and to ensure alignment of the leaves when in the book, suggest to the children that they make as a punching gauge a strip of card 4 in. long and about 1½ in. wide, with holes punched in the right places. This placed over, say, six sheets will make the punching absolutely accurate.

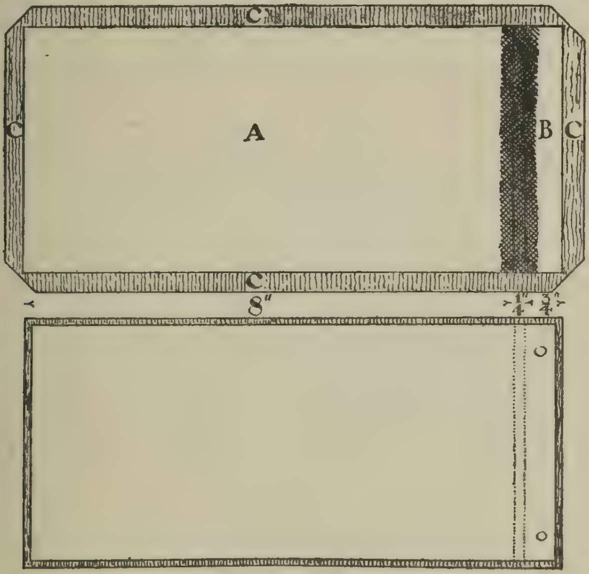


Fig. 91. Autograph Album Covers

When the sheets are ready covers will be needed, and are made as shown in Fig. 91.

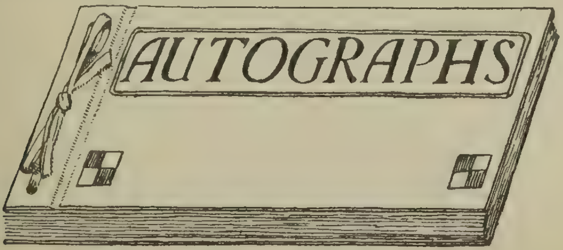


Fig. 92. The Autograph Album

A and *B* are two pieces of any suitable cardboard which are pasted down on to serviceable covering paper, *C*, leaving a parallel gap of $\frac{1}{4}$ in. between their inner edges. These edges are improved by thinning with sand-paper on a block of wood.

Paste a strip of muslin, or any thin flexible stuff, over the joint, and rub down firmly. Paste along edges of card, turn margin over and press, afterward lining the inside neatly with a panel of thin coloured paper. Punch holes to the gauge, lace the loose sheets in with tape through holes in covers, and tie with a bow (Fig. 92).

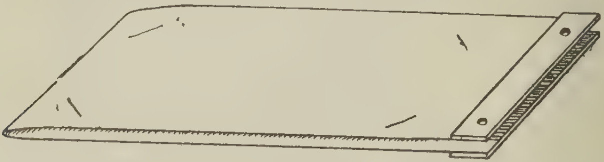


Fig. 93. Detail of Postcard Album

For a further exercise make a photograph or postcard album on the same principle, but use folded sheets for the latter, these being cut with angular slits to receive the corners of the cards. To prevent bulging of the album when filled thin pieces of card are pasted on the inner ends of the leaves. This is necessary to balance the thickness of the postcards (Fig. 93).

Portfolio for Loose Drawings

This is similar to a cover for a book bound 'out of cases' and is a suitable preliminary exercise. It is punched through the back leaf only, the drawing being laced as before, but with the knot on the inside.

The sketch (Fig. 94) shows the construction—the left half finished, the right half showing details and materials.

The cards are laid down with inner edges parallel and $\frac{3}{4}$ in. apart. A strip of book-cloth, *A*, 9 in. by $2\frac{3}{4}$ in., is glued down to lines drawn on the card, and the joined cards turned over. A piece of brown paper $\frac{3}{4}$ in. wide, *B*, is pressed down between the edges on to the cloth, and acts as a stiffener. The cloth is neatly pulled over and pressed down at head and foot, keeping the fold level with the long edges of the cards. Another strip, *C*, of the same material as *A*, about 2 in. wide, is pasted over the inside of the joint as a lining, and the covering material, *D*, is pasted and folded over the outside of the covers. Two panels of suitable smooth paper are pasted on the inside, and when the case is set the holes are punched.

As drawings are completed they are punched and laced in the case.

Other articles of a similar character will suggest themselves.

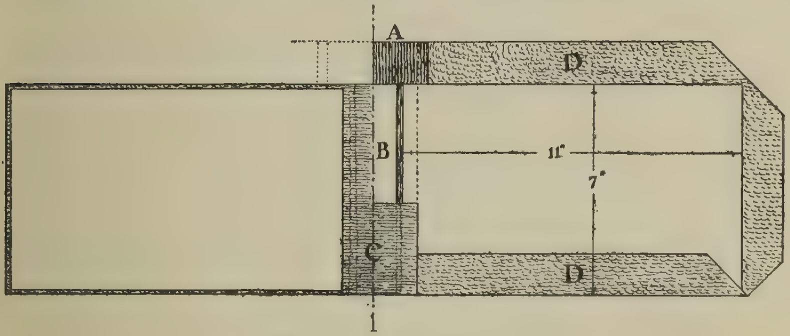


Fig. 94. The Portfolio

Pockets, made like a folded sugar-bag, can easily be fixed to the inside. Note-cases and wallets should present no difficulties.

Binding a Volume

Scholars may desire to bind a periodical, or to repair a school-book which needs rebinding. In these examples the sections need careful separation. If wire-stitched the wires are lifted with a bradawl resting on a strip of metal, and drawn with pliers. Rusty wires often need to be scraped before they will pull clear. If the sections are sewn the tapes and threads will be cut and taken out. Be careful in both cases to keep the sections whole. Any glue remaining on the edges is picked off with the fingers or scraped away with a blunt knife. The sections are separated by passing a table-knife between them.

Take a few sections and ‘ knock up ’ at the back and head (top) by letting them drop by their own weight on to some solid surface. Do this alternately at head and back until both edges are flat.

Lay the sections on an iron slab, or similar surface, with a piece of waste paper over and under them. Then hammer the folds to flatten and remove creases. The sections are again knocked up and placed in the standing press.

The letter-press described on page 35 will be invaluable for bookbinding, but a very good substitute has been used in the writer's classes, and although requiring a little practice in judging the spread of the wedges, it makes an efficient standing press (see Fig. 95). The timber must be as stout as can be worked, but hardwood is not essential. The joints may be made with screws or nails, and strengthened by having a piece of stout tin or sheet iron bent over at right angles and screwed.

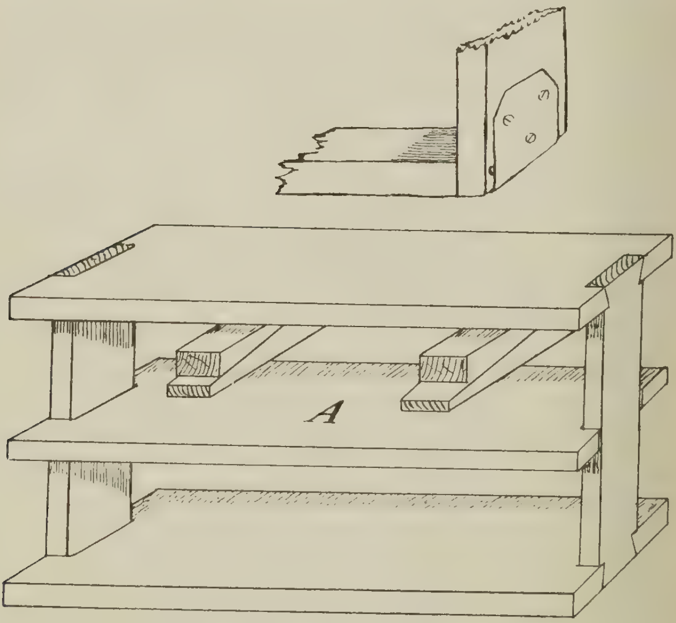


Fig. 95. The Standing Press

The board *A* is fitted to slide up and down before the top piece is secured. Wedges of varying depth, in pairs, should be provided, although packing pieces will be as handy. The wedges are sawn from a piece previously planed parallel, the sawn surfaces being smoothed. The books to be pressed are sandwiched between boards larger than the books themselves, the packing pieces are adjusted under the wedges, and the latter driven tight with a hammer. Leave the sections in the press for a few hours.

If the notebooks of the pupils are to be bound they are treated as sections and pressed as described. It will be found that these are best if they contain not more than ten leaves. The need for binding these will arise when sufficient have accumulated.

Preparation for Sewing

The pupil should examine a bound book, or, better still, take an old one to pieces. He will notice the end-papers, the sewing on to tapes or cords, the glueing, rounding, and backing, the cutting of the edges, and the finish of the covers.

The Sewing-frame

A frame is necessary for the proper sewing of the book, and although the regulation sewing-frame is an elaborate affair a simple one is quite satisfactory in a class-room (see Fig. 96). A board, say, 12 in. by 8 in., prevented from warping by two strips nailed or screwed across the ends, has secured to the front edge a frame something like a goal-post, the front of *A* being exactly over the edge of the base board. Owing to the problem of storage, a difficulty experienced in most schools, it has been found desirable to have a frame which is collapsible.

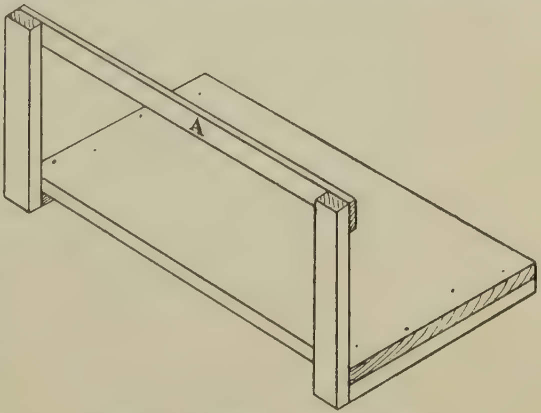


Fig. 96. A Simple Sewing-frame

In this case the base remains the same, the uprights being hinged, as shown in Fig. 97. The lower end of each has a ¼-in. hole, through which passes a loop of twine, one end passing over a screw. The other receives a small piece of pencil, nicked to hold the cord. The pencil when turned acts as a lever to a tourniquet, and, making a Spanish windlass, holds the upright securely. To cause the frame to collapse slacken the strings, unhook the screw-end, and fold the uprights down on the board. Thus a book not completely sewn may be stored with the frame, and the work resumed at the next lesson without detaching the cords or tapes.

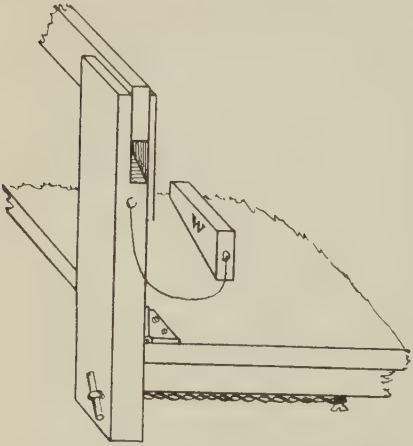


Fig. 97. Detail of Collapsible Frame

The tapes must be slackened when folding over the sections on the board. This is done by lowering the cross-bar, which has at each end two deep wedges, *W*. These are in position when the tapes are fixed, and are withdrawn before folding. To avoid losing them fasten to the frame with string.

A piece of thick cloth glued to the inside of the upright is handy for holding the needle when the frame is not in use.

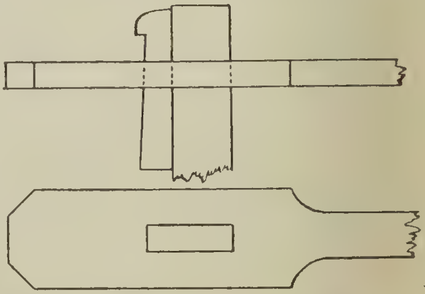


Fig. 98. Alternative Upright and Bar

As an alternative the cross-bar may be made adjustable as in Fig. 98, this making a suitable exercise where a woodwork room is available.

Making End-papers

Between the cover of a book and the letterpress will be found, at both ends, coloured or white leaves which serve as a further protection to the printed matter and give a finish to the book. Occasionally they carry a printed design or illustration. The outer leaves are pasted to the covers.

Two sets are needed for each book (Fig. 99). In cheap work the end-papers are just single sheets pasted to the ‘spine’ or back.

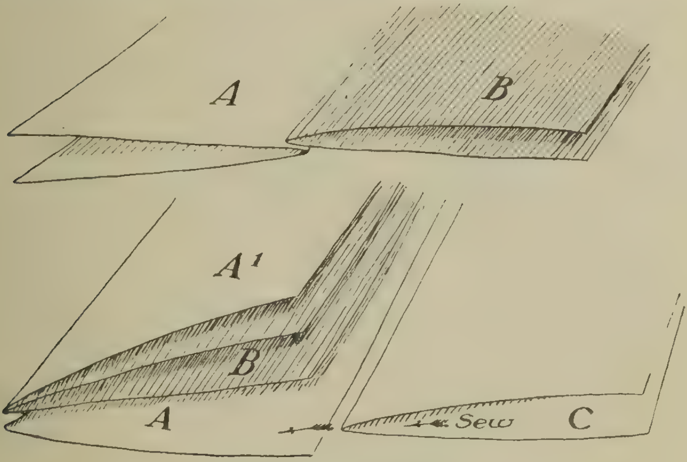


Fig. 99. Making End-papers

A is a piece of white paper $\frac{3}{4}$ in. greater in length and width when folded than the page of the book; *B* being a similar piece of coloured paper, which eventually lines the inside of the cover. Paste the two sheets together with a $\frac{1}{4}$-in. or $\frac{3}{8}$-in. lap.

Fold *A* as shown, the lower edge having a ‘bellows’ fold. It is best to indent all lines to be folded with the edge of a paper-folder. The folded edges of *A* and *B* must be truly in line with each other.

A^1 is a waste piece, but it is retained until the covers are to be affixed. Another piece of white paper, as shown by *C*, is put in before sewing in best work.

To paste a number of sheets at one operation arrange them as in Fig. 100. Give the made end-papers a nip in the press when dry.

Sewing

Having accumulated a number of notebooks which are to be bound, remove the covers and the thread which secures the pages. These are now the sections. The preparation of a periodical has already been described. Squeeze the whole in the press. Lay the sections on the sewing-frame, with end-papers at the top and underneath, *waste pieces outward.* With pencil and try-square mark the line of the 'kettle-stitch'; also mark with double lines the positions of the three tapes. The first line should be about ½ in. from each end, the others spaced approximately as shown. Set up the tapes taut, fixing with drawing-pins. Double the tapes where pins are driven through. Remove the sections from the board and prepare the needle with a length of bookbinders' thread. Lay the first end-paper on the board, waste side down. Lift up the upper half by slipping the left hand into the sewing-fold (see Fig. 99), and hold the edge to the tapes with the tips of the fingers.

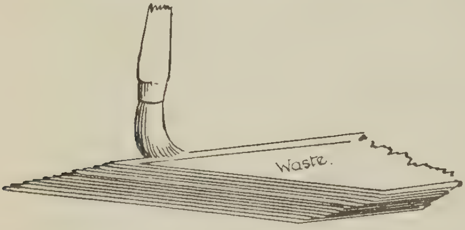


Fig. 100. Pasting a Series of End-papers

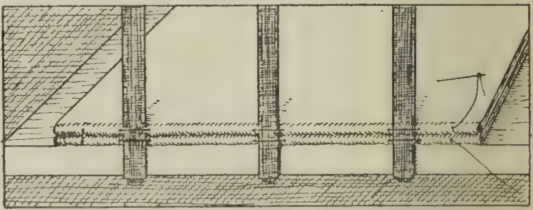


Fig. 101. Sewing to Tapes

Insert the needle at the kettle-stitch and pass it out again alongside the first tape (Fig. 101). Carry it over this, in again at the left side, and so on, until the left kettle-stitch mark is reached, where the needle passes out, and entering the first section is taken along it, finishing exactly over the first entry in the end-paper. Draw the thread just tight, and tie the end, which has been left projecting about four inches, to the main thread.

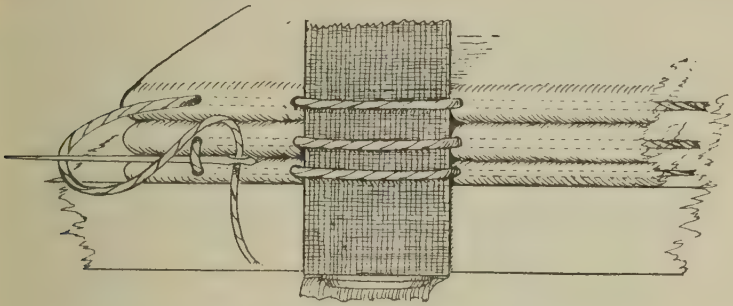


Fig. 102. The 'Kettle' or Catch Stitch

Place the second section in position and, entering the needle at the kettle-stitch mark, repeat the sewing. At the end this section is connected with the previous one by a kettle-stitch before passing into the third section (Fig. 102). This is repeated at each line of sewing. At the last section (the end-paper) secure the thread by a couple of these stitches and cut it close.

Joining Threads. The knots should occur inside the book and should be made with a weaver's knot (Fig. 103). *A* is passed over *B* and held at the joint by the left forefinger and thumb. A loop is made of *B* round its own end, passing over *A* each time, *A* being then bent back over *B* and through the loop. The lower part of *B* is pulled tight. Boy Scouts will recognize the knot as a sheet bend.

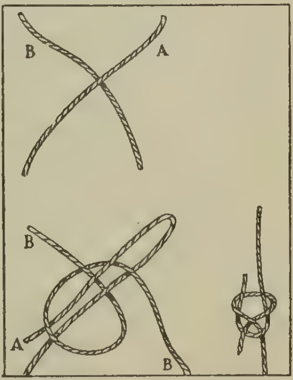


Fig. 103. Weaver's Knot

Take out the drawing-pins on completion of the sewing, and cut the tapes 1 in. from the book at each side.

Place the book in the press with back edge just showing, squeeze up the sections, and pull the tapes tight. Then brush hot glue into the back, tapes, and thread, and leave to set for some hours.

Several books may be pressed and glued if a sheet of tin is placed between each.

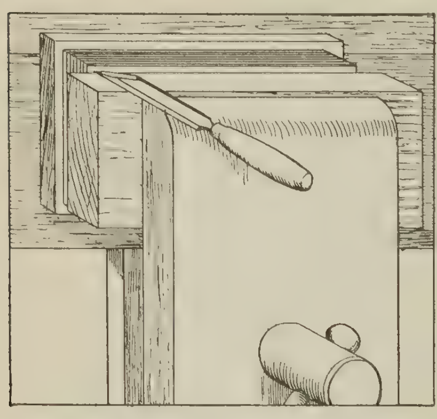


Fig. 104. Trimming Edges with Chisel

Cutting the Edges

A cutting-press and plough are ideal for bookbinding, but, these being expensive, we must improvise, and this can be done with a deep bench-vice (Fig. 104).

Another method is to fasten the book to a board with G cramps (Fig. 105), using a planed piece of wood as a guide for the chisel, which is drawn toward the operator. Heavy cuts must be avoided if the book-edge is to be cut cleanly and true.

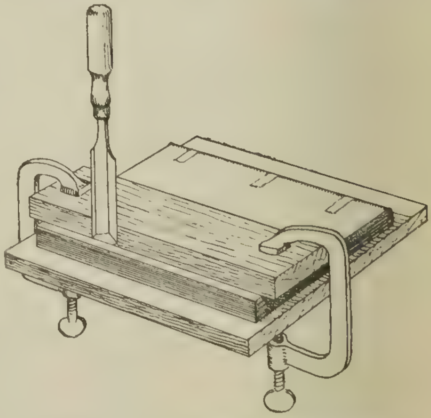


Fig. 105. An Alternative Method

The cut edges can be sand-papered while under pressure, if necessary. Splashing the edges with red ink, using a toothbrush along the bristles of which a small stick is drawn, is a great joke with children, particularly if a few grains of rice or maize are laid on the surface beforehand so as to leave white patches.

A good cutting- and backing-press—a lying press—is a necessity if good work is sought. The writer has made one with wooden bench-screws and oak slabs, but the cutting of the holes was a tedious task, and it can only be done with expert labour.

As the first cost is the last and a press will never wear out, an effort should be made to secure two steel vice-screws at 8*s.* 6*d.* each.

These are fitted through pieces of wood—hardwood preferably, though soft wood will do—each piece being 2½ ft. by 3½ in. by 2¾ in. (Fig. 106).

The nuts are let into the far edge of the outer piece, the screw-holes being bored a shade larger than the diameter of the screws to allow for unequal screwing up. The plate *X*, in two halves, secures the end of the handle. There are two runners for the plough on the back slab. The press is turned over when backing a book, the underside being used.

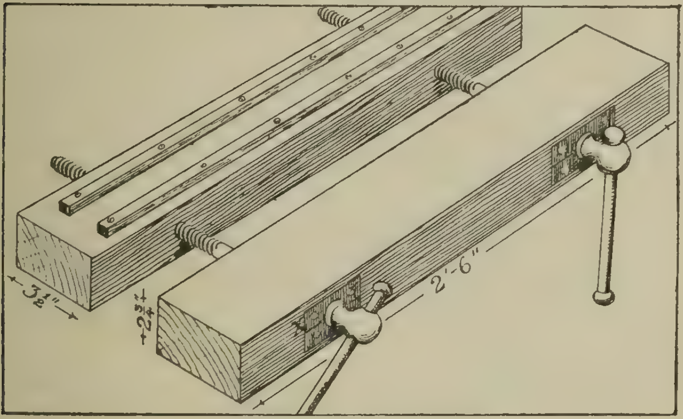


Fig. 106. The Cutting-press

When in use the press is best placed across a strong packing-case, into which the cuttings fall.

Mark the waste with pencil lines parallel to the back for the front edge and square to it for head and tail. Lower the book, with a thin board behind it to take the pressure of the knife, into the press. Draw the screws just tight enough to hold the book, and adjust it until the line is level with the face of the press. Screw up firmly before cutting. Cut the head and tail first. A piece of waste cardboard, which may be cut, is sometimes put between press and book at the near side.

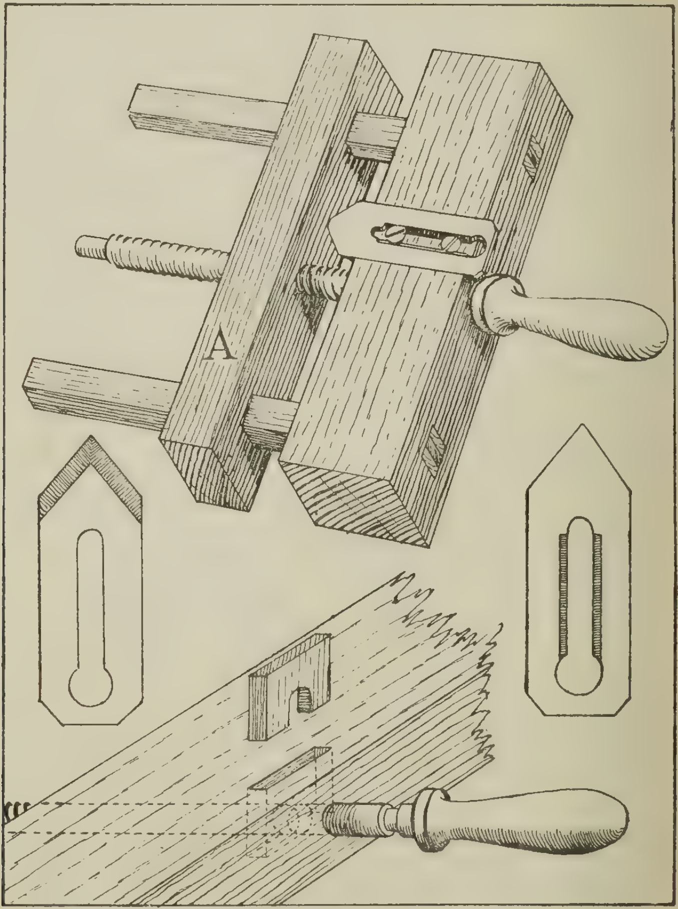


Fig. 107. The Plough, with Details

The plough is made from a joiner's hand-screw (Fig. 107), the piece *A* and the screw only being retained. The larger piece and the guides are added, and the lower sketch shows the method of securing the screw so that, while revolving freely, it remains attached to the cross-piece.

The blade is an old plane iron held by strong screws, 1½ in. by 18 or 20 gauge, passing through the slot, which is bevelled with a file to take the heads level. The shanks of the screws should fit the slot, and the surfaces of the heads must not project. Fit the screws with care, as they are taken out frequently when sharpening the blade.

Make sure that the blade lies flat on the press. If the edge is tilted the cutting is bad. The blade may be packed with paper at either end to correct this.

All being ready, place the plough in the runners, and adjust the screw to bring the knife-edge to the paper. Draw back, turn the screw to feed the knife in, and slide forward. The first cut should be as light as possible. Draw the plough back, give a slight turn to the handle, and cut again. Cut on the forward stroke only. Beginners may make ragged edges (*a*) by turning the screw too much at a time, (*b*) by having a dull knife, or (*c*) by neglecting to screw the press sufficiently.

A frequent method of cutting a book out of boards—*i.e.*, when boards are not secured by strings laced through (see p. 161)—is to attach the boards, cut to shape, to the waste end-paper with a dab of paste, the right-hand board being stuck as much below the top edge as it is to be cut off, and the left one as much below the tail as is required to be cut. A waste piece of strawboard is inserted between board and book at the left side to prevent the board from being cut.

When the top edge is cut the book is turned over, the right-hand board now becoming the left. When cutting the front edge draw the near board back a sufficient amount, and insert the protecting piece of waste board between the far board and the book. (See Fig. 114.)

Rounding the Back

These operations precede cutting in best work, but with children the writer has found the reverse to be more satisfactory.

Soften the glue on the back with water. Lay the book on a table or desk with the back away from you. Put the left thumb against the fore-edge and the fingers on top. With a shoemaker's (large face) hammer in the right hand, tap along the upper edge of back, drawing the sections forward. Pull with the fingers and press with the thumb. Turn the book over and repeat.

Turn back again and work the hammer until the back is well rounded and the fore-edge hollowed. A well-shaped back and front will be arcs of circles. Again, do not hurry, as any faults will be permanent.

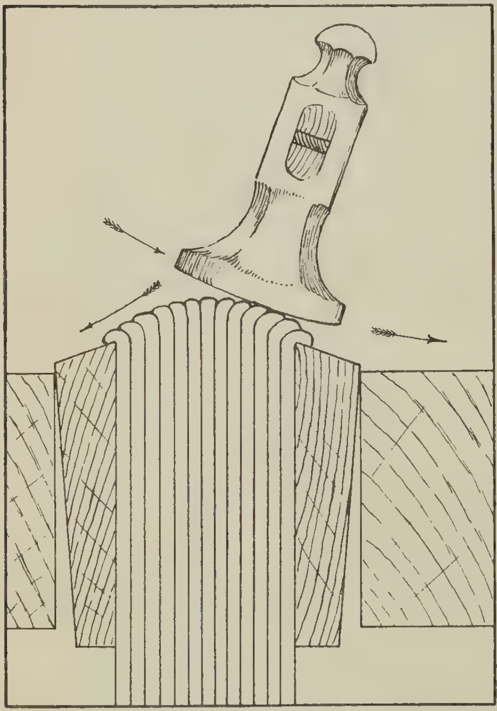


Fig. 108. Backing with Hammer

Backing

This is to form a groove or ledge against which the edges of the covers fit.

Backing boards of hardwood are placed at the sides with upper edges to a pencil line showing the amount of turn over. This depends on the thickness of the covers. Take care that both edges of these boards are parallel. Lower the whole carefully into the press and screw very tightly.

The hammer is not brought down with a crash, but with a glancing blow outward as shown by the arrows (Fig. 108). Start gently along a line just off the middle, and, working along the lines of the sections, finish on the edges. Beat the edges down firmly to get a sharp groove. Careless hammering will smash the edges and spoil the book.

Rub in a little glue again, and finally press on to the rounded back a piece of brown paper to cover it.

A strip of muslin, or bookbinders' canvas, is often glued on the back. This passes over the edges, the width of the muslin being the same as the length of the tapes. This should be done before the brown paper is fixed. The muslin is omitted if a *hollow back* is required when binding *in cases.* (See p. 167.)

The book being now ready for the covers, these should be prepared exactly as already described for the drawing portfolio, except that the panel of lining paper is not needed.

Careful adjustment is necessary to get the curved back fitting correctly, neither too slack nor too tight. This is best done by trial on the book.

Securing the End-papers

The cover being completed, the book is laid on the table and the waste piece of end-paper torn off.

A larger piece is slipped under the first coloured end-paper, the tapes and canvas (if any) are glued down and laid straight on it, and the whole of the end-paper pasted, the brush being worked outward from the centre. Thin paste will distort the end-paper and cause cockling.

Slip the waste piece out, lay the correct half of the cover down, and press with the hand. Turn the book over and repeat the process at the other side, the 'heels' of the covers being well set into the backing grooves.

Carefully raise each cover in turn to see that the tapes and end-papers are adhering properly, press out any air-pockets, wipe away any stray particles of paste, and with a board at both sides, *not covering the hinge*, put the whole under pressure, and leave for a few hours.

It will be noted that two sheets of the end-papers show the stitching and a fold between. Paste these two together at any convenient time and put under pressure.

Some prefer to attach the tapes first, and let the book dry before pasting the end-paper to the cover.

Binding in Boards

This is the method used for best work, and should be attempted only by older pupils.

Instead of tapes hemp cords are used. These cords may be embedded in the back by making saw-cuts across the sections (Fig. 109), or they may stand up on the back, the covering (of leather) being moulded over them, so dividing the back into panels.

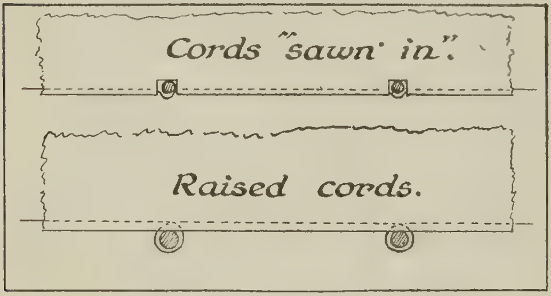


Fig. 109. The Cords

The latter method is outside the scope of this book, and beyond the capacity of children.

For school work hollow backs are most suitable. The sections are knocked up as before and, without including the end-papers, set out from the cords on the frame as before, but single lines represent the positions of the cords. Where three tapes were used five cords will be needed.

Screw the book in the lying press with a board at each side, and cut across the lines, kettle-stitch included, to the depth of the saw-teeth, using a fine tenon-saw (Fig. 110). The cords must be set up square to the base, and they will lie in the cuts as the sections are brought up.

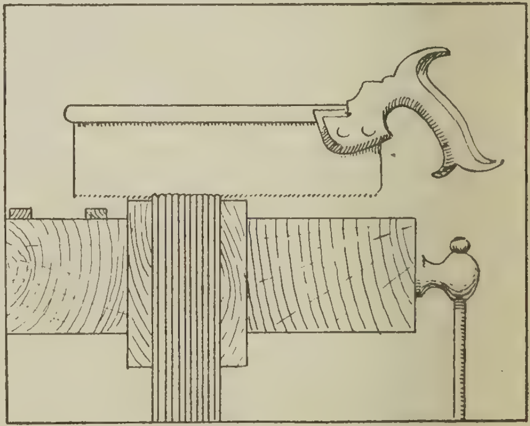


Fig. 110. Sawing the Grooves

Sewing is the same as with tapes, but the sections will need to be pressed down, as sewn, with a small stick, the thread being pulled down with the finger-nail.

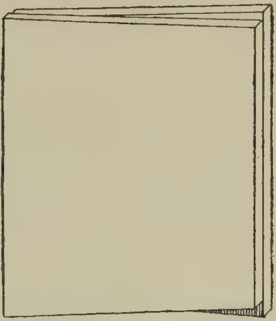


Fig. 111. Testing Boards for Squareness

In raised cords the thread passes completely round the cord as shown in Fig. 109.

When the sewing is completed cut the cords 3 in. from the book. Fray out the ends with a bodkin, and gather together again with a little paste on the tips of finger and thumb.

Round and back the book.

For covers use millboards, or hard cardboard. Cut both boards at the same time, square and parallel with press and plough, having regard to the ultimate size of book after the edges have been cut.

Make the length equal to the shortest leaf (unless this is very short) and the width equal to the distance from the backing groove to the fore-edge of first section (not end-papers). Keep the boards in pairs, and on the outside mark the first-cut edge as back, the others as head, tail, and fore-edge respectively. Test for squareness by reversing the boards, and correct any errors (Fig. 111).

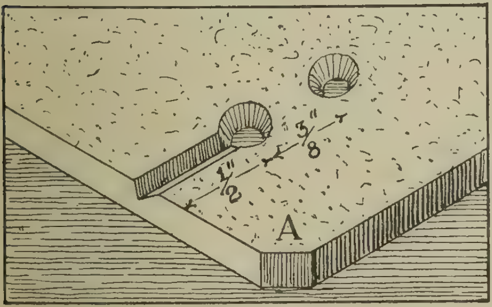


Fig. 112. Detail of Cord Groove and Holes

For leather covers the outsides and back edges are covered with smooth paper. Place the boards on the book, and mark the positions of the holes and grooves from the cords when set up. Do not punch the holes cleanly with a punch, but use a bodkin. Take off the sharp corner (as at *A*) at head and tail (Fig. 112). Cut a groove with a chisel from the first holes to the back edge. The cords will lie in these.

With boards in position pass the pointed ends of the cords through the first holes from the outside.

Pull all tight from the inside, and return the end through second hole. Again pull tight; then hammer down slightly, and cut off the thread close to the board when you are satisfied that the hinge is well fitting.

With cover opened lay the book down on a block of metal, and hammer the cords down on the inside. Now put the book, with a tin sheet between each end-paper, under pressure in the press.

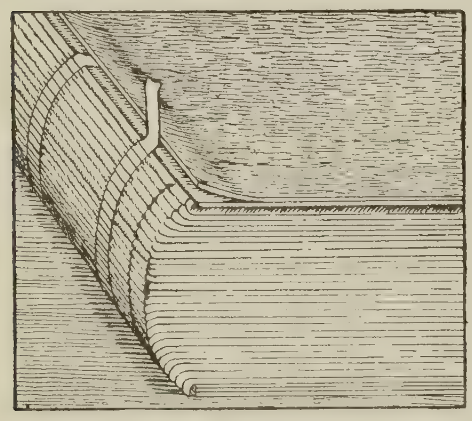


Fig. 113. Inserting Tapes in Split Boards

Paste is rubbed into the back, the surplus wiped off, and the book left in the press for twelve hours.

Tapes may be used for this method, but the boards should be built up of one thick piece and one thin. The two inner board edges are left unglued for about 1½ in. when fastening together. The tapes can be pushed with a blunt knife between the slightly opened boards, which are then glued and pressed. (See Fig. 113.)

The remaining operations are the same whether the boards are on tapes or cords.

Cutting in Boards

Take the book from the press, remove the tins, and cut the edges in the order of head, tail, and fore-edge. The book is secured in the press with the back toward the worker (the plough cuts forward). Pull the right-hand board down to show the amount to be cut off—the cords will allow this.

A waste piece of cardboard is put between the left board and the book as a 'cut-against,' and this protects the board from the knife (Fig. 114).

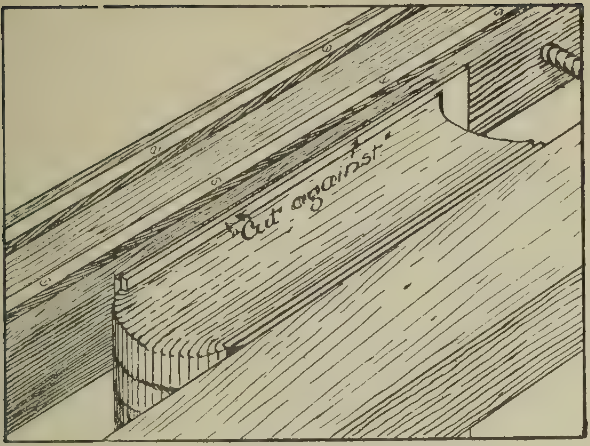


Fig. 114. Cutting the Head in Boards

Lower the book till the top of the right board is dead level with the surface of the press, and the left board is a little raised and parallel to the left side of the press. Great care must be taken to avoid failure, and the cutting requires close attention.

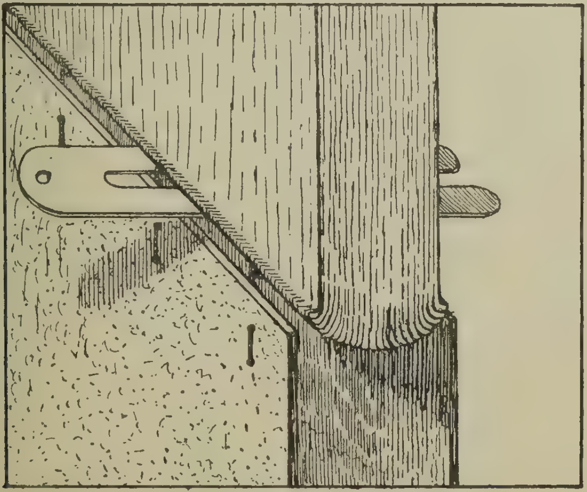


Fig. 115. Trindles inserted

Cut the tail next. As the book is turned over the right board now becomes the left.

To cut the fore-edge press the boards back to their original position—*i.e.*, with edges projecting equally at head and tail. Draw a pencil line along the front edge of the board down the end-paper, and then mark an amount equal to the projection of board at head or tail below this pencil line. This shows the amount to be cut off.

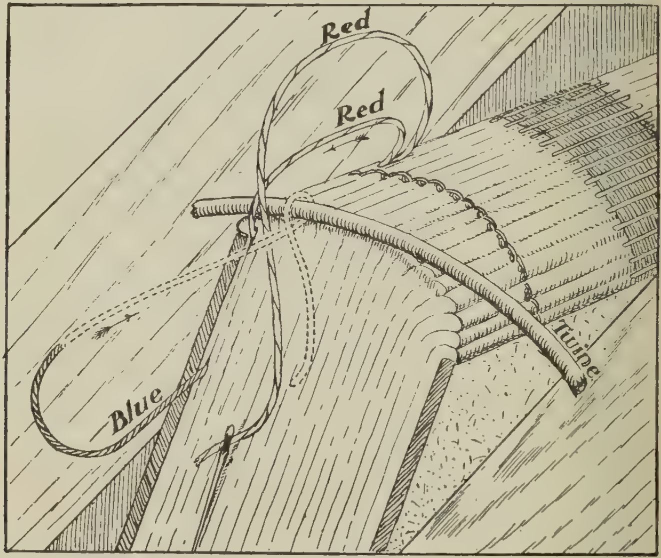


Fig. 116. HEADBAND: THE FIRST STEPS

Take hold of book with boards turned back and hanging down. Insert a couple of 'trindles'—sheet-brass or steel plates of a shape similar to that of a button-polisher (Fig. 115).

Cutting-boards are now placed at each side, the covers are raised to the horizontal, and the back is knocked flat by bumping it on the surface of the press. Place the right cutting-board to pencil line, the left one projecting a little above as a 'cut-against' and, taking the trindles out, lower the whole into the press, the boards, of course, hanging downward. A band of tape tied round the book (with the knot at the end) will be helpful if put on before the cutting-boards. Cut as before. When the book is taken from the press it returns to its previous shape. For rounded corners mark the curve from a small coin; pare vertically with a chisel, and finish with sand-paper.

Headbands

Place the book in the press at an angle of 45°. Thread a needle with a length of, say, red marking-cotton or stout silk in double, and tie to it a similar length of blue or other suitable colour. Push the needle in at the middle of the first section (not the end-paper) at an angle which causes it to pass out just below the kettle-stitches (Fig. 116). Pull tight till the knot stops at the inside of the section. Bring the needle over and pass it in again through the same hole, forming a loop over the corner of the book. Insert a piece of smooth twine or catgut or a strip of leather or cane into the loop and pull the red thread tight. Bring the red thread a second time over the twine, and hold down on the head of the book. Pass the blue over the red, under the twine, and back over it, making a blue 'bead,' and pull tight (Fig. 117).

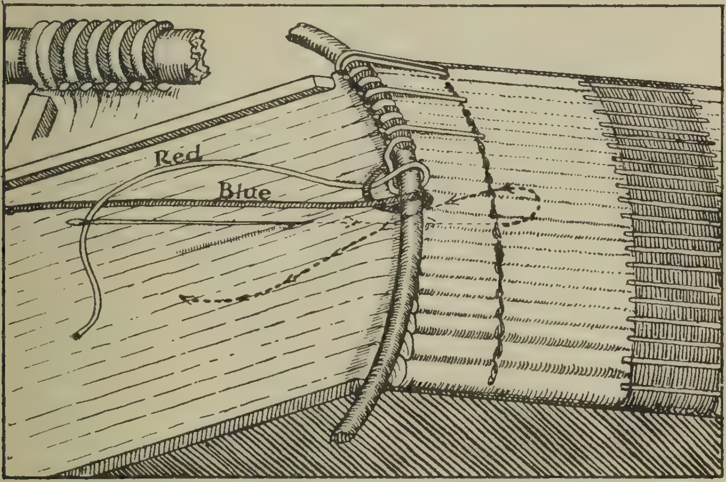


Fig. 117. HEADBAND: MAKING THE 'BEADS'

Hold the blue down, pass the red over it, under the twine, and over it, so forming a red bead. You now have alternate bands of red and blue round the twine. Repeat with blue and red alternately. At the fourth or fifth bead pass the needle (red thread) over the blue, then inside the next section, as at the beginning, under the kettle-stitches and so over the twine. Hold down, carry the blue over the red, under the twine, and over as before, continuing this process to the end, but repeating the 'through - section' stitch with the red at frequent intervals. Close the beads up tight with the finger-nail as you proceed.

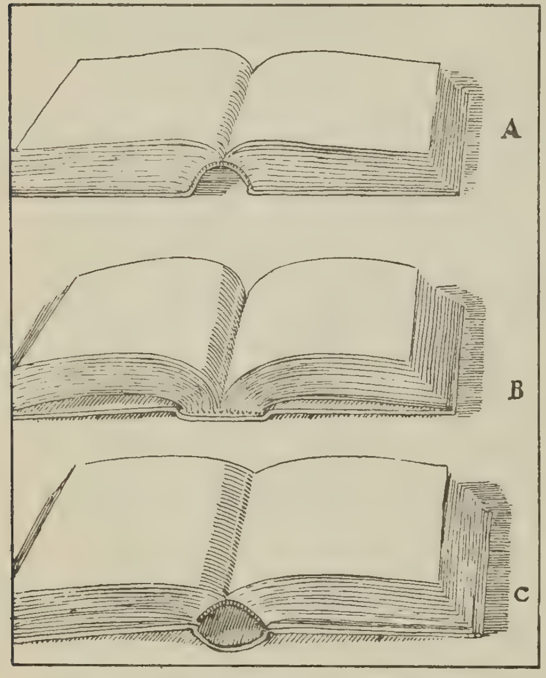


Fig. 118. Flexible and Hollow Backs

Tie off the cotton at the end, fray out, and paste down. Cut the twine level, and finish with a touch of glue at each end.

Repeat the headband at the tail of the book. Keep the section-stitches parallel to the edges of the book, or the headband will pucker.

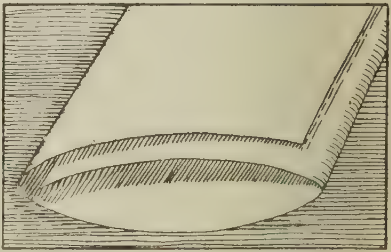


Fig. 119. Making the Paper Tube

If the book is to have a flat or flexible back paste a strip of brown paper down the length of the back (or 'spine,' as it is called), and smooth this, when dry, with sand-paper.

Covering

Book-covers may be finished in a variety of materials and styles. In common work the whole case will be covered with cloth, or sometimes paper. In better work the back, or 'spine,' parts of the sides, and the corners will be covered with leather or similar superior material. Such a book would be termed "half-bound in leather." The finest work is accomplished when the whole of the cover is enclosed in leather, the surfaces being sometimes inlaid with choice coloured skins and decorated or tooled in gold.

Vellum is sometimes used for high-class work.

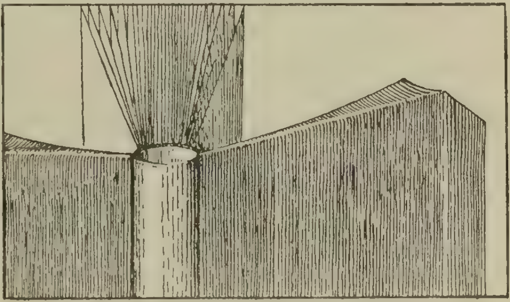


Fig. 120. Folding in at Head and Tail

It is well at this point to note the difference between flexible and hollow backs. In Fig 118 *A* and *B* are flexible and *C* hollow.

Flexible backs are best sewn on raised cords, this being the strongest method. Hollow backs open better, but are not so durable.

As we have remarked already, binding on raised cords calls for competent craftsmanship, and it is beyond the ability of children who are working unaided.

To make a Hollow Back

Cut a piece of stiff brown paper, a little longer than the back and three times its width. Fold this sideways into three equal folds and paste the last fold down, so forming an elliptical tube with a single thickness one side and a double one the other (Fig. 119). Glue the single side to the back, rubbing down well, and making adhesion perfect over the whole surface.

When dry slit the folded edges a little at top and bottom to allow the cover material to be turned in.

Prepare covering cloth to size, allowing ½ in. or a little more for turning over. Mark pencil lines on the inside to indicate the position of the book. The cloth is pasted all over. One side of the folded book is placed in position on to it and pressed down. Turn the book over to ensure this. Turn back again and gently pull the cloth over the back on to the upper board.

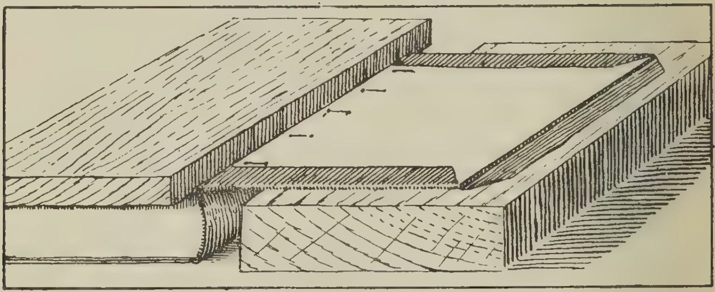


Fig. 121. TURNING THE FORE-EDGE OVER THE BOARD

The overhanging cloth is brought over the edges of the boards at head and tail, and turned in through the slits of the paper tube at the back (Fig. 120). Fore-edges are left until the last.

The cover is opened out flat. A wooden board is placed on the book, with its edge in the backing groove, and the cover pressed against it to ensure its being squared up close, the material being pulled over and folded down (Fig. 121).

The mitreing of the corners is shown on p. 143. Give the book a squeeze in the press, and leave it to set dry under a light weight. The end-papers are pasted down after the book has set, care being needed to bring the paper quite flat at the joint.

CHAPTER XI

Writing and Lettering

Introductory

THE transmutation of sound-conveying forms from the stone-cut alphabets of the Romans to the pen-written characters of the later scribes, and from thence to the formal type-letters of the printer, is an absorbing study, and forms a necessary and fitting prelude to any adventure in printing. The close connexion between manuscript writing and the printer's art is established when we realize that our type-faces are but adaptations of pen-written letters, modified and standardized for convenience. Because of this no study of the printer's craft is complete without some experience of the art which was the forerunner of typography.

The first type-cutters copied, as closely as possible, the models of the scribes and illuminators of the fifteenth century, and although the transcription was extremely accurate the prejudice against the printing-press was so strong that the writer's craft survived for at least a century after Gutenberg had printed his famous forty-two-lined Bible.

Such was the opposition that the new method could make headway only by basing its letter-forms on the finest examples of formal writing. Even then the aid of the limner was frequently sought for initial letters and ornaments, so that many of the early books contain both written and printed text.

The Roman alphabet was originally cut *into* the surface of stone or wood, and these forms were, no doubt, evolved from some simpler calligraphy. They did not lend themselves to speed when written with a quill, and so were used to a limited extent in the original form, but in their pen-forms we have the genesis of our lower case and cursive letters. To quote from Edward Johnston's admirable work, *Writing, Illuminating, and Lettering*, " The letters [*i.e.*, cursive] are nothing more than the old Roman letters written with speed and thus undergoing certain modifications in their forms, which eventually developed into the minuscule [1] hand."

The ability to read implies familiarity with the letter-forms which interpret sounds of speech to the eye, and we can ask that these, besides being symbols of sound, shall be symbols of beauty also—that they shall give us æsthetic satisfaction in themselves. The surest road to an appreciation of the delight to be found in printed letters is through the study of written forms. The beautiful printed books of William Morris owed much to the fact that he was a calligrapher and illuminator before he became a printer.

That manuscript writing, lettering, and illuminating have great educational values has long been recognized. The setting of letter to letter, the arrangement of word to word, the spacing of lines and ornaments, and the massing toward a complete, rhythmic whole in key with the spirit of the matter, all combine to offer a task—a delightful task—which entails a valuable discipline of hand and eye.

Manuscript writing, or, more correctly, script writing of a conventional form, has of late years been used extensively in schools to the accompaniment of an apparently unending controversy as to its merits or demerits. The idea behind it, however, has been very largely utilitarian. Little or no attempt has been made to use it as a basis for the teaching of design or as an approach to the study of lettering, except in schools of art.

The whole problem of writing concerns itself, first and last, with the pen, and, curiously enough, this implement seems never to have been considered in the dispute. The ordinary steel pen is a highly finished piece of engineering which has been evolved through generations of cursive writing, and for that purpose it is unsurpassed. To place this, with its expressionless, delicate point into the hands of children is to compel them to use a tool which is unsympathetic to the last degree. No wonder that they discard it on reaching adult age, and adopt a shorter, more tractable tool in the familiar broad points, of which the 'J' is an example.

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[1] Minuscule = small letters, not capitals.

Of recent years manufacturers have produced steel manuscript pens, notably Reeve's 'oblique' and Mitchell's 'square' edges, both made in a considerable variety of widths.

To appreciate writing, to enjoy it, to make it an operation of great pleasure, the child should make the pen for himself; to appreciate good lettering and writing, or, in fact, any other art, the pupil should endeavour to produce it. Nothing will stimulate his efforts more effectively than a well-cut reed or cane pen, especially if he makes it unaided.

The project is an easy one, and the pen can be made from a piece of thin bamboo 'garden' cane, obtainable from a seedsman, usually in 3-feet lengths, costing a penny a cane. From one of these six pens may be made. Choose a cane about ¼ in. or 5⁄16 in. diameter. Reeds are difficult to obtain, and are too soft for school use. Quills, unequalled for fine work, cannot be cut satisfactorily by small children, but scholars of fourteen and upward who, by using a cane pen, have realized the subtle skill required to cut a quill, can do it provided they know how to produce a keen edge on a penknife. Then that usually fearsome weapon will really become a *pen*-knife.

Making the Pen

Saw off, with a fine saw, a piece of cane about 6 in. in length. From a point about 1½ in. from the end make a cut with a sharp and narrow penknife, reducing the end to half its original thickness. Make a second cut from about ½ in. from the end, thus reducing the tip to a quarter of the thickness. Pare this inner edge carefully until the soft interior has been cut away, leaving the outer tough shell, and make certain that the surface left is quite flat, as at *A* in sketch showing end of pen (Fig. 122). *B* and *C* are hollow and round respectively, and will be found faulty.

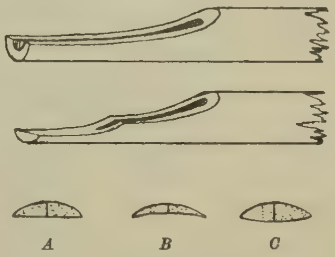


Fig. 122. First Stages in making Cane Pen

Hold the pen with the flat of the nib resting on a piece of hardwood, and slit the nib by pressing the knife-point down at about $\frac{3}{4}$ in. from the tip. Take care that the knife-blade does not close up.

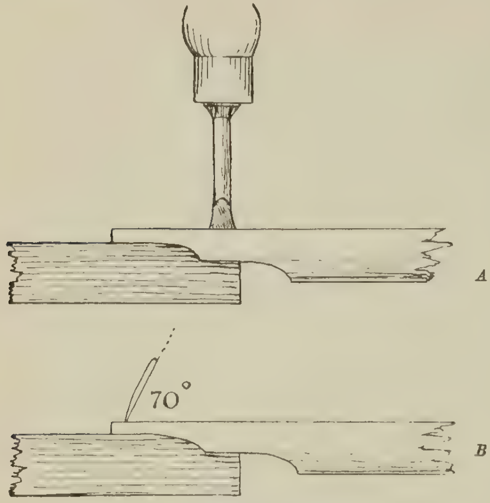


Fig. 123. Making the Slit

For children's use keep a fine, sharp bradawl or a special knife the handle of which is bound with wire to prevent the blade from closing on the fingers (Fig. 123, *A*). The slit will usually be long enough to carry the ink, but if, after trial, it needs to be longer, press the under side of the point carefully on a board or twist the bradawl slightly, so causing the slit to lengthen.

Burn out the soft pith for about 2 ins. with a red-hot needle.

For our first writing the point is best cut off square to the slit.

The point may now be pared to the required width—for general work $\frac{1}{16}$ in. or a little less—cutting with care so that the slit remains in the middle.

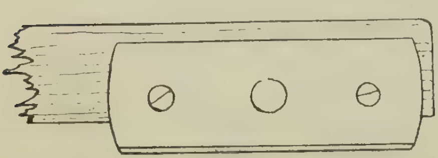


Fig. 124. Safety-razor Cutter

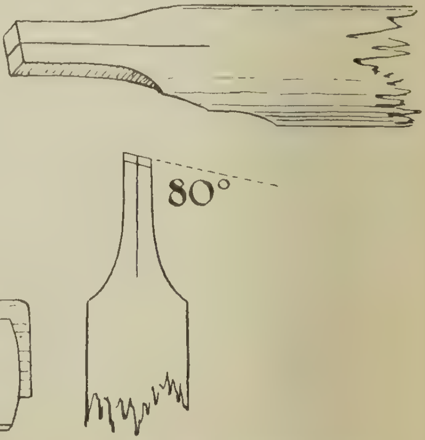


Fig. 125. The Inclined Edge

To make the sharp lower edge cut across the tip with the knife-blade inclined as shown, at an angle of from 70° to 80° (Fig. 123, *B*). For this purpose a safety-razor blade screwed to a wooden handle is unequalled (Fig. 124).

Inspect the working-edge with a magnifying glass. After some writing with a right-angled edge it should be suggested to the pupil that an inclined edge to the pen may be an advantage, and he should test this advice by cutting across the point at an angle of from 70° to 80° to the slit (Fig. 125).

A reservoir, or container, will be needed to hold the ink. With an old pair of strong scissors or tin 'snips' cut from a piece of thin sheet-brass, or from an empty cocoa-tin, a tapering strip (Fig. 126). Bend it as shown, *A* being 1 in. from the narrow end. The bent end is pushed into the hollow of the cane until the broad end rests, without upward pressure, about ⅛ in. from the writing-edge of the nib, the loop being adjusted so that the spring is held firmly.

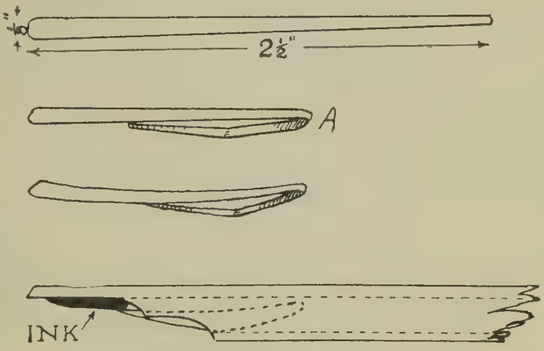


Fig. 126. Making the Ink Reservoir

Apply ink to the pen with a small brush, or the quill filler usually attached to the stoppers of Indian ink bottles. The nib will require a little working on the thumb-nail before the ink flows to the point. When the nib is blunted by use a clean cut across the end will restore the sharp edge.

Writing

Always use an inclined board. A drawing-board placed so that the back rests against the front edge of the desk, while the lower edge rests on the knees, is most convenient in schools. If writing is attempted on a flat desk the ink flows too quickly down the pen and the freedom of hand is limited. The board will require some adjustment of slope, more to suit the pen than the penman.

The paper is best held by a piece of tape passed tightly round the board, or by having pins passed through small pieces of stout card and pressed into the board so that the heads grip the paper, the steel point just missing the edges.

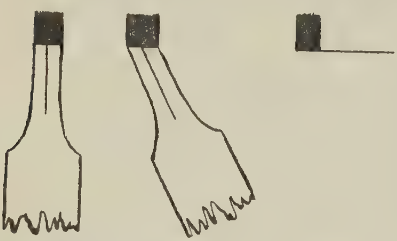


Fig. 127. Horizontal and Vertical Strokes

It is very convenient if the paper can be raised as each line is completed, so that the writing line is always at the same level.

Cover the lower portion of the sheet with a stout piece of paper, which may be pinned. Have a piece of scrap paper on which to test the pen pinned at the right side of the board.

The pen should be held in the usual manner, but without exerting undue pressure on the sheet. If properly cut the pen will produce a thin horizontal stroke and a thick vertical one (Fig. 127).

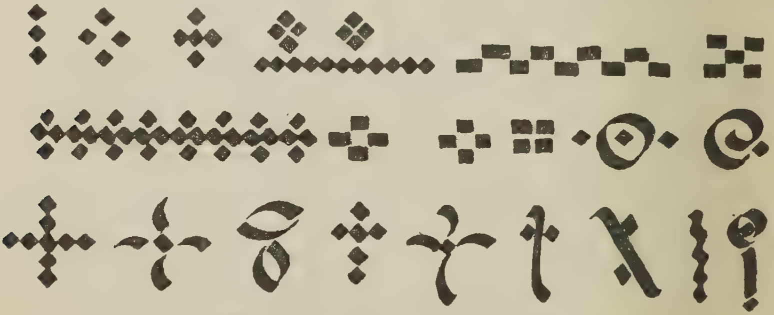


Fig. 128. Pen-formed Ornaments

Avoid ink getting elsewhere than *under* the nib of the pen.

It is best, at the beginning, to set the pupils to practise free strokes and any convenient forms of letters. In this way they will become used to the action of the pen. They quickly realize that writing, as they have known it with ordinary pens, is not easy with the new tool, and that the letters will need building up.

To obtain facility in this it is good practice to sharpen a pencil to a chisel edge, or as near in shape to the cane pen as possible, on a piece of sand-paper, and to use this in acquiring a formal hand.

Pen-formed ornaments are fascinating to children, and these should be shown to them at an early stage. Various arrangements of the square full stop quickly arouse their interest, and these help considerably to give full control of the pen (Fig. 128).

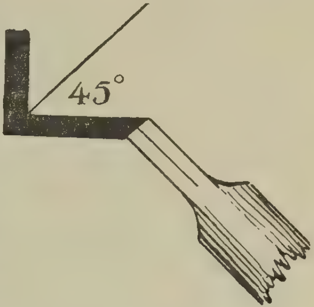


Fig. 129. Slope of Oblique Pen

After some experiment and practice it is probable that the oblique-pointed pen will be adopted by the majority of the pupils, as it allows the new pen to be worked at an angle similar to that of the usual writing implement. As a general rule the angle of the pen in the hand will be most efficient when it brings the writing edge at a slope of 45° to the perpendicular and horizontal (Fig. 129).

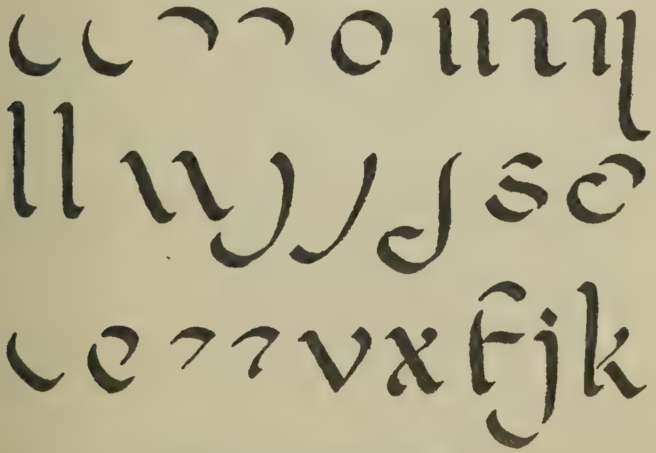


Fig. 130. Practice Strokes

With the pen in this position a fairly speedy hand can be acquired, and the forms of the letters are pleasing. After experiment this style has usually been adopted by the writer's pupils, and it well serves the purpose for manuscript writing.

Following some practice with the strokes shown in Fig 130, the pupils should next attempt to acquire a formal hand. As

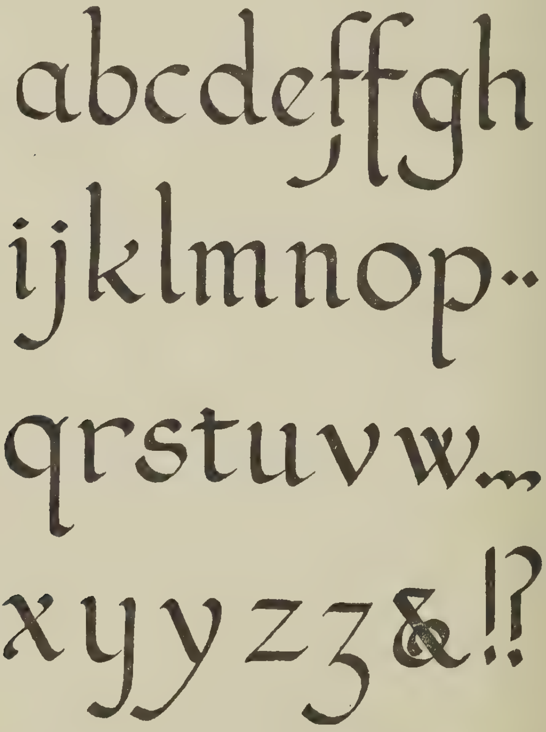

abcdeffgh
ijklmnop..
qrstuvw...
xyyzz&!?

Fig. 131. A Useful Alphabet

they will need some instruction, hectographed copies should be issued, which will show a definite style of letter, and also the method of combining the strokes.

Too rigid insistence on specified shapes is not advisable. The variations from a set style, customary in a class, should be encouraged rather than suppressed.

A useful alphabet is shown in Fig. 131. The need for well-formed letters and good spacing should be stressed.

Practise the letters unjoined—the coupling will come later.

Some strokes seem to offer permanent difficulty, notably the long ascenders, as *l*, *h*, etc. Considerable practice with these may be necessary to secure confident, straight strokes instead of faulty ones (see Fig. 132). Practice with the shorter verticals, as in *m*, will help, but it will be as well if early effort is spent on the curves forming *c*, *o*, and *e*. These combined with the vertical strokes make *a*, *b*, *d*, etc., and the pupil may then essay the sloping components of *v*, *w*, *k*, and *y*. A variation of the serifs is shown in Fig. 132.

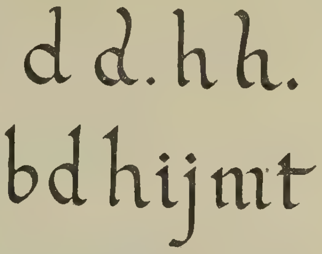


Fig. 132. Correct and Faulty Strokes

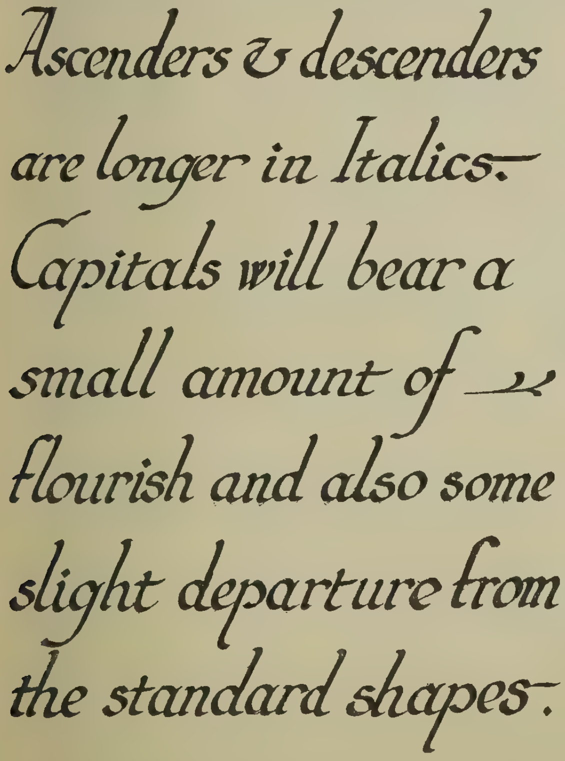


Fig. 133. Italic Writing

The best writing is produced by building the letters of separate strokes as shown in Fig. 130, but if speed is desired many of the letters can be accomplished in one stroke without a break in the movement.

Some children will wish to write at the slope. There is no objection to this so long as the inclination is not excessive. The letters will approximate to italics, and there need be no alteration in the individual shapes except that they will be less round and more slender (Fig. 133).

The ascenders and descenders need to be longer than in plain manuscript, and consequently the lines should be spaced a little wider.

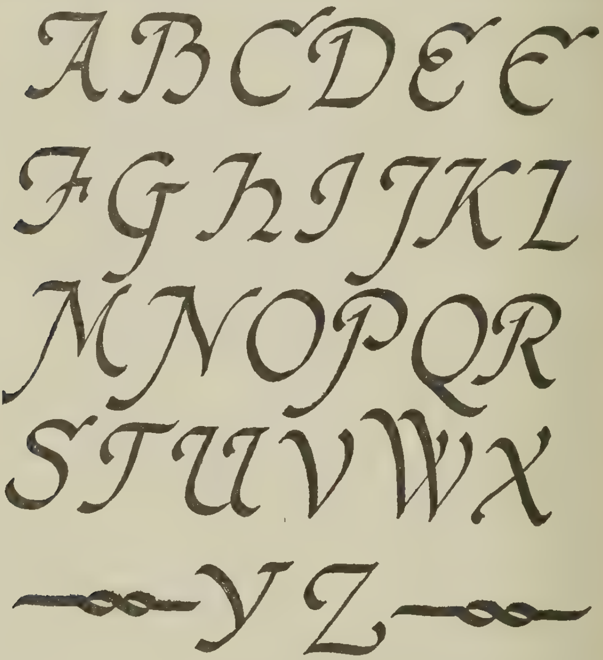


Fig. 134. Italic Capitals

Capitals will bear some amount of flourish (Fig. 134).

Display-writing

Write between lines for early practice. The space between the lines of writing may vary according to the desired effect, but a good rule is to make it three times the height of a small letter. Practice soon leads to evenness of letters, and height-lines can be discarded.

Slow writing is natural until command of the pen is acquired, but the pupil should be persuaded to break away from the tendency to draw the letters with laborious care. Rather should he try to make them sharply and cleanly, pausing between the separate letters, but executing each with some speed. If this advice is followed it will be found that the writing, while being perhaps somewhat irregular, will have a quality of directness and vigour which is absent when the work is done with meticulous effort. Attempts at rapid writing give that confidence and evenness which cannot be obtained otherwise.

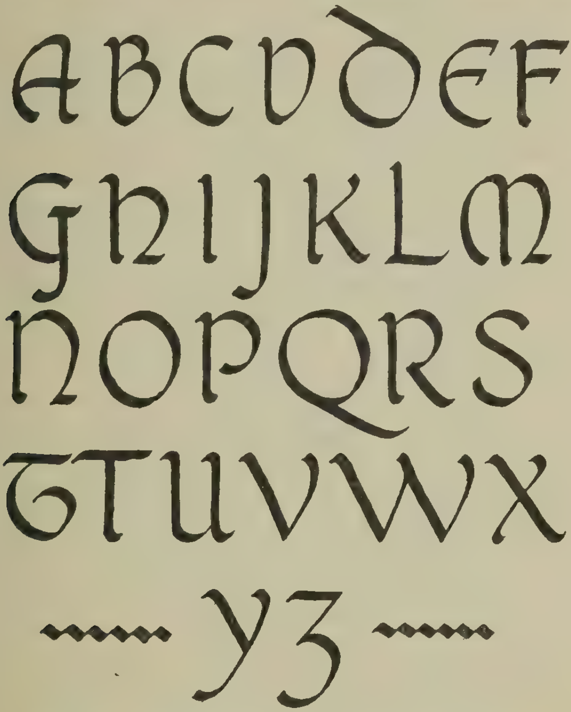


Fig. 135. Capitals based on Lower-case Letters

The spaces between words are extremely important. A capable printer endeavours to get an even grey mass to his work, and avoids disturbing patches of white or ‘rivers’ showing here and there.

A good test is to examine a piece of typography or writing with the eyes half closed, when excessive white spaces are at once apparent. The letters should be as close together as is convenient without marring legibility; a space slightly less than a small *o* is a safe standard.

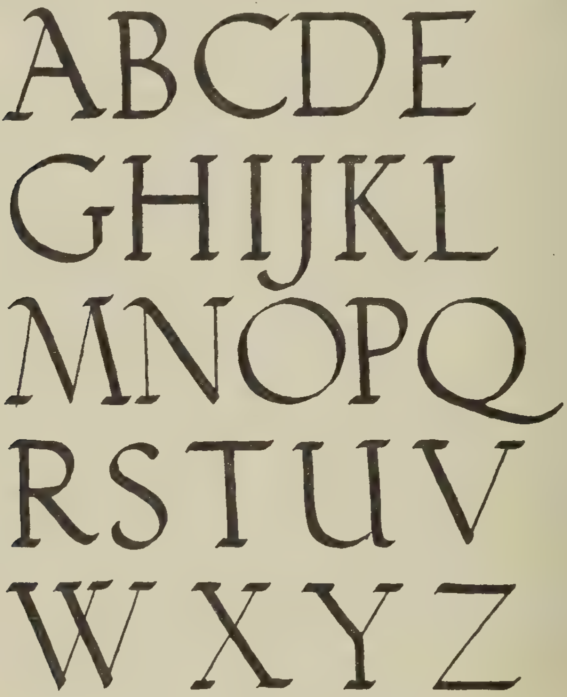


Fig. 136. Roman Capitals

Capitals

Capitals based on lower-case letters (Fig. 135), should be first attempted, and pen-formed Roman capitals later (Fig. 136).

Versals

These are pen-formed letters which are built up rather than written directly, and they are well worth study and practice. Their beautifully balanced outlines at once proclaim the pen-built letter (Fig. 137).

With a little ornament, judiciously applied, they were much used in manuscripts of the eleventh to the thirteenth centuries, and as a means of brightening the writings of our young scribes they are unsurpassed. A narrow pen with a longer slit than usual is required, and the edge must be sharp for the fine serifs. The letters are built up with quickly drawn strokes, and filled in at once with a plentiful flow of colour. Coloured versals at the beginnings of paragraphs, or as headlines, are very effective, and a few exercises in these form an excellent prelude to illuminating proper.

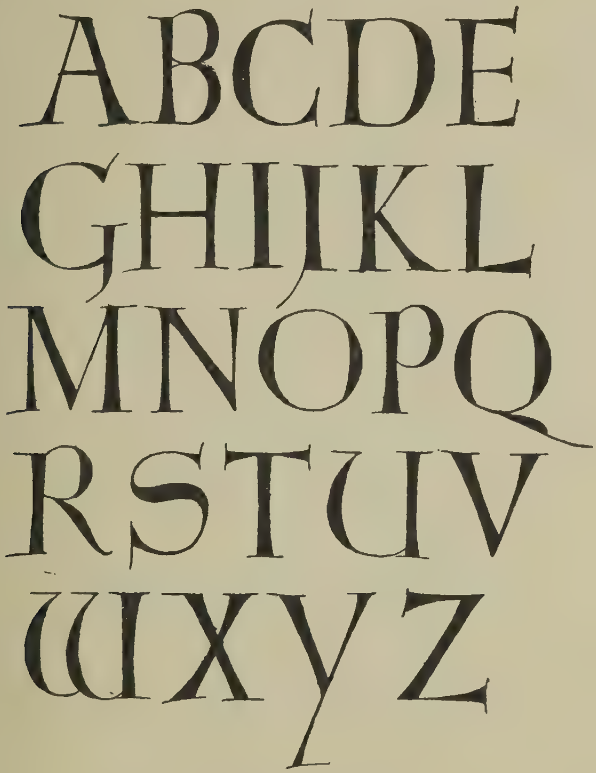


Fig. 137. Versals

Colours

Ordinary water-colours will serve if mixed to a suitable consistency. The student's quality of scarlet is quite good enough for ordinary class-work, but orange vermilion should be used for best work. It has a hue which can be appreciated only by comparison with other reds.

In choosing the colours one cannot do better than follow the precept of the master-limners and confine oneself to a limited palette. Red, blue, green, purple, and black are amply sufficient. Gold may be used in advanced stages, but gilding with gold leaf is a difficult task for adults, and is quite beyond young fingers. Shell gold or matt gold, deposited on the inner surface of a mussel shell, is rather expensive for school use, but the pupil may care to buy it for himself, and use it for spots and dots which can be slightly burnished with an agate burnisher.

These spots should be 'furred' with colour (Fig. 138).

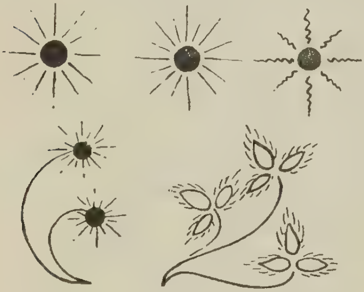


Fig. 138. Ornaments

For red use orange vermilion; for green use viridian, with a trace of white to give body; for blue use cobalt for pale tints, and ultramarine with a touch of Prussian blue for dark blues; for purple use rose madder with a little ultramarine.

Margins

Nothing detracts from the effect of good writing so much as unsuitable margins, and many a piece of otherwise pleasing work is marred, if not spoiled, by the want of a little adjustment of the writing to the paper.

The mass of writing first requires consideration. A square mass is rarely satisfactory, and it probably would be just as easy to arrange it to form a rectangle, with a length approximating to one and a half times the width. Presuming that this rectangle is to stand vertically, the margin at the head should be a shade less than that at each side, while the space at the foot should be considerably larger (Fig. 139). The outer margins of a double sheet remain as for a single sheet, but the inner margin—*i.e.*, the total space between the two masses of writing—

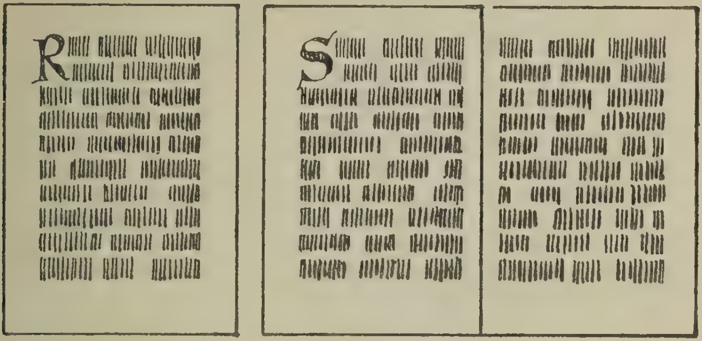


Fig. 139. Margins

should be equal to one side margin. Test the values of the margins by cutting a piece of dark paper to the size of the writing and placing it in various positions.

When some ability in writing, spacing, and simple ornament

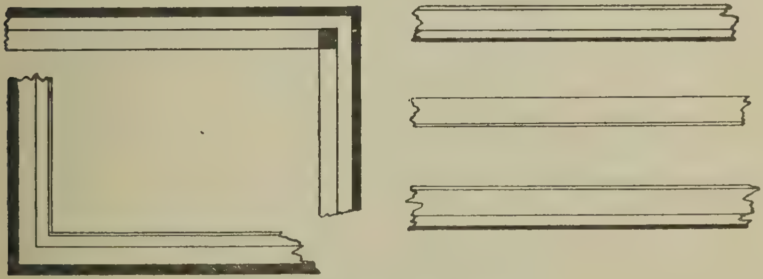


Fig. 140. Plain Line Borders

has been acquired the pupil may venture into the interesting field of borders and more ambitious pen-formed ornaments.

No satisfactory rule seems possible to decide whether a page of writing should be bordered or further ornamented. A well-written mass is, and should be, beautiful in itself, and great restraint is needed, especially with children, lest the writing is swamped in a plethora of ornament, so that the effect of the previous work is diffused and lost in confusion.

For an effective border it is doubtful if plain lines forming a well-balanced margin can be improved upon, and in the arrangement and spacing of these there is great variety. A single line is often quite satisfactory, and if this should not be sufficiently strong another line, slightly narrower, may be added close to the inner side. Always keep the outer line stronger than the inner. A few plain-line borders are shown in Fig. 140.

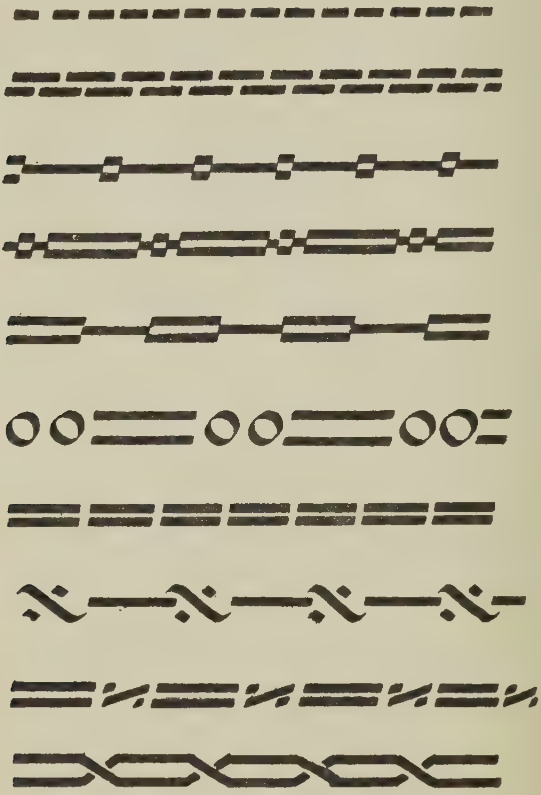


Fig. 141. Simple Pen Borders

The tone-value of the border should be proportionate to that of the writing. If the mass of writing is light in colour, a deep, heavy border will overwhelm the writing, and draw attention to itself instead of leaving the eye to appreciate the text. Again, if the mass is of a deep tone, the letters and words being closely spaced, a delicately lined border will be ill fitting.

Rule a few borders of varying strengths on a sheet of paper, and try the effect of these in an approximately correct position against the writing, looking at the whole through half-closed eyes.

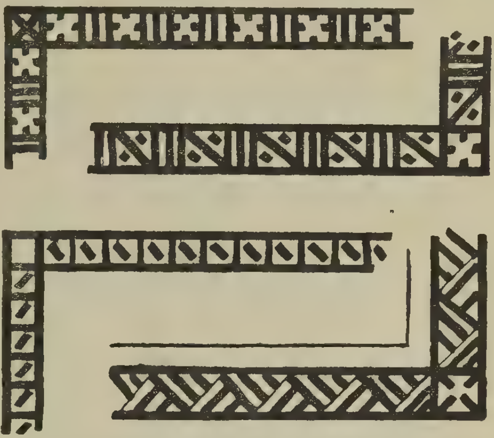


Fig. 142. Pen-built Borders

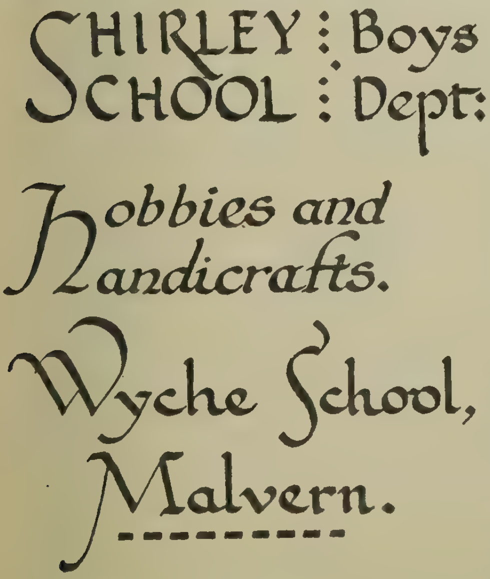


Fig. 143. Grouping Exercises

The pen-formed borders shown in Fig. 141 indicate the great variety of combination which is possible with simple pen-strokes. A few similar examples shown to the pupils will be sufficient to secure an infinity of designs.

The pen-built examples in Fig. 141 are perhaps more useful in some circumstances than those in Fig. 142, and opportunity to design similar borders should be afforded to the class. Perfect regularity of units is not required:

indeed such an achievement will detract considerably from the value of the design, because it should, above all, show the distinct qualities of pencraft.

The pupils will desire to make these borders of mixed colours—say black and red—and one experiment at least should be allowed, as it will probably emphasize the unsatisfactory result of such a procedure. These experiments are only occasionally successful.

If two colours are desired it is better to isolate them by a small space than to have the two colours jumbled together. An outer border of black and an inner line of red make a simple but effective combination.

Display Grouping

Pupils will be familiar with many advertisements wherein the words of the title are grouped to form a device.

The composition of these in class is a pleasant occupation, giving excellent practice in pen-manipulation and appreciation of balance in lettering (Fig. 143).

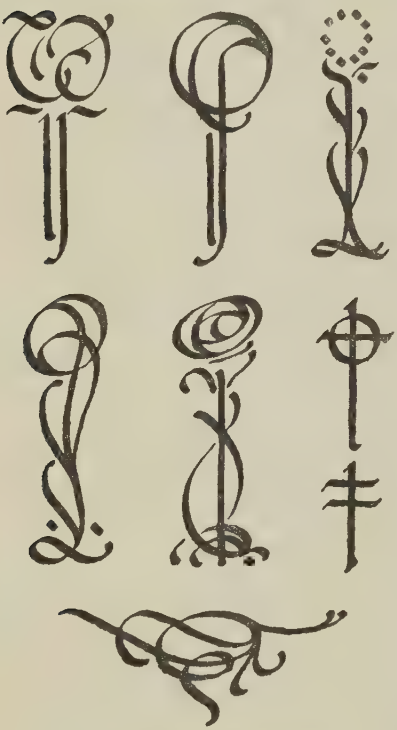


Fig. 144. Page Ornaments

Page Ornaments

Fig. 144 shows a few freely drawn ornaments which are built up with pen-strokes. They are designed as ornaments to follow titles, or as tail or side decorations, and they may with advantage be carried out in colour. They are best accomplished by being practised a few times with a broad pencil before the pen is used. The first forms should be drawn boldly; the proportion and balance can be adjusted later.

The Scroll

An opportunity for combining literary work with more formal handwork lies in the making of a scroll. It may well form a preface to exercises in bookbinding, as historically the scroll preceded the book. The exercise has a further value in so far as it establishes in the child-mind the concrete principle of the right angle.

A piece of irregular-shaped plain paper of good quality, about 12 in. by 8 in., or of similar convenient size, is served out. One of the edges is then cut straight with knife and straight-edge. The width, say 7 in., is now measured from the cut edge at both ends, and the edges of the paper made parallel. A piece of ‘dowel stick,’ a cheap, turned hardwood sold as curtain rod, $\frac{5}{8}$ in. or $\frac{3}{4}$ in. in diameter, is now cut to length $7\frac{1}{2}$ in. by each child. He places the paper flat on the desk, and putting the stick across one end proceeds to roll the paper round the stick as one rolls a carpet.

It is obvious that if the stick has been placed at right angles across the sheet the edges will roll up with each layer exactly over the others. It is more likely that at the first effort the edges as they roll up will take a conical form at one end and a corresponding hollow cone at the other, in which case the scroll will be unrolled and another attempt made to adjust the stick to the correct position.

Repeated efforts may be necessary, but as soon as the true rolling is accomplished the scroll is carefully unwound, and just before the stick reaches the end of the paper a pencil is passed along it, so making a line which is certainly at right angles to the edges.

Cut the paper to this line, and fasten it to the roller. This must be done with liquid glue, as paste dries too slowly.

If necessary the other end may be served in the same way. It should be cut parallel to the top, marking it from the roller as before.

A second roller may be added at the lower edge. If the lower roller is omitted the edge of the paper may be laced with a strip of brightly coloured ribbon for tying round the rolled scroll.

The scroll will be used for a piece of manuscript writing, preferably illuminated with coloured initials and ornaments.

Provision for hanging should be made on the upper roller.

Rhyme-Sheets

A variation of the above is to make the scroll into a rhyme-sheet.

This is a piece of verse or prose, original if possible, to which is added a decoration at the head and foot. The ornament may be a line or mass drawing washed in with water-colour or, better still, coloured inks, for greater luminosity, and it should be of a bold and simple character.

It is usually better to have the headpiece larger than the tailpiece, and the placing of these furnishes an excellent opportunity for the exercise of judgment in balance.

A good plan is to make a rough tracing in ink on a piece of thin, clear celluloid, and by moving this about over the sheet to select the most fitting position.

A wood- or lino-block print may be used for the upper decoration, but, of course, it will need to be gummed on, as the paper used for the writing is not suitable for printing by hand-pressure. Stencilling in colours is equally effective for the head- and tail-pieces.

The reader is recommended to a study of the delightful rhyme-sheets published by the Poetry Bookshop, 38 Great Russell Street, London, W.C.1, and sold for a few pence. These examples of modern poetry and appropriate decoration show some of the most striking designs by the late Lovat Frazer, the brothers Nash, and others.

A Few Useful Hints

Use a sharp knife for pen-cutting; a blunt one is worse than useless.

Keep the pen sharp with an occasional cut across the tip.

Script writing and manuscript writing are as far apart as the poles; the one being a convenience, the other an art.

When essaying a piece of writing draft it out in pencil first to see how the words and lines resolve themselves toward the mass effect.

Remember that readableness is the first consideration, and that legibility, beauty, and character are the desired ends.

Avoid excess of ornament; the writing should be delightful in itself. Use your decorations as a composer uses the rest in music; they should take the place of pauses. Initial letters, well drawn and cunningly placed, will light up (*i.e.*, illuminate) what may otherwise be a quite plain page. There is plenty of colour in well-contrasted black and white.

Use a good Indian ink—waterproof, if possible. Of the many varieties Higgins' is the best. Water-colours make good 'inks,' so one need not be at a loss for colour. Special illuminating colours can be bought; they are more vivid than ordinary colours, and more opaque, but are rather expensive.

School Posters

The frequent need for posters containing announcements of the various activities of school life—societies, concerts, sports, publication of the magazine, and similar events calling for advertisement—extends the field of application for the student of writing and lettering. It is an attractive method of combining study with practice, and there is the keenest competition for the honour of being allowed to do special work of this nature.

A few general rules should be followed. The lettering must, above all, be clear; it should be devoid of complicated members, and must be capable of being read at a distance.

The attention of the pupils will be directed to the hoardings, or to a school collection of posters. Discussion helps in the elimination of unnecessary features, besides stimulating the critical faculty.

No general rule can be laid down here for the much-debated problem of the proportion of lettering to the whole design, but if a design—*i.e.*, a picture or a device—is to be included it should be sufficiently attractive in itself to compel attention.

Unless our pupils include one or two potential artists it is wise to avoid attempts at pictorial art which may become merely ludicrous. Occasionally one comes across a genius who may accomplish a presentable drawing, but as a rule the designers should be persuaded to make their appeal through the lettering alone.

The usual school (or college !) poster is often a painful example of how not to do it. Thin, spidery letters, usually much too large, outlined in blue-black writing ink, and filled in with innumerable pen-scratches are frequently surrounded with indescribable figures and 'designs.' If nothing else is possible, cut a set of bold stencils, and make your posters from these.

For general use there is nothing more suitable than brown paper—the coarser the better—and pastels or coloured chalks. The manuscript letters shown in Figs. 131 and 135 are easily written if the chalk is sharpened to a chisel edge on sandpaper.

First make a sketch of the arrangement, and from this set out the poster in pencil, drawing lines, if required, for the letters.

Roughly outline the letters in pencil to fix their positions, and having decided the colour scheme write the letters boldly and freely. Added confidence is gained if one makes the stroke in the air before applying the chalk to the paper. Should the larger coloured letters not stand out clearly from the background they should be outlined with a black pastel. If this is done neatly the effect is to sharpen the letters.

Keep to a small range of colours, and endeavour to strike harmonies by using yellows, reds, and white. Pale blue and green are useful, but the darker shades of these are liable to be lost against the brown background. The darker colours are serviceable only on a light paper.

If more permanent posters are needed they should be done either in tempera (see p. 182) or water-colours, with Chinese white added to give body. These, if mixed to the right consistency, can be used with a cane or steel manuscript-pen, and if a wide cane pen is required it can be cut from a stout bamboo of from ½ in. to ¾ in. diameter, and made exactly as was the small pen.

Parcel-writing pens, used by packers, and sold by commercial stationers, are useful for large writing, but are difficult to keep clean. They are made of laminated brass springs, and hold a fair quantity of colour.

Pure Roman letters will be outlined with a small pen, and filled in with a brush. Only pen-written or pen-built (versals) letters can be done with a manuscript-pen.

One of the most effective additions to a poster lies in bordering it with suitable lines. A broad, plain line, harmonizing in colour with the letters, gives a solidity and sense of wholeness. A simple combination of wide and narrow lines in different colours will sometimes pull together a poster in which the colour scheme has not been quite successful.

Sign-writing

Sign-writing is but a step farther than the designing of posters, giving plenty of scope for the young artist and 'man of letters.' Space does not permit of extensive treatment of the subject here, but a few hints may be set down for guidance.

Door-plates ("Library," "Laboratory," "Headmaster," "Handicraft Room," etc.) can be executed by the average pupil with little practice. Prepare the plate of suitable wood, shaped to a standard pattern, and coat with priming paint—red lead ground in oil, with turps added. When dry sandpaper the surface if necessary, and give two thin coats, well brushed, of the colour required. When dry lightly pencil or chalk in the letters, and then paint in with fairly thin colour, which is best bought from a reputable oil and colour store. Buy the best. Two coats are necessary for good work.

The usual sign-writer's brushes, called pencils, are the best for the purpose, but considerable practice is needed to handle them, so that the most suitable brushes are ordinary sables.

If the pupil can practise with the long flexible pencil he will find it infinitely superior to a shorter brush, but it will prove a puzzling tool at first. It holds much more colour, and, used almost flat on the board, gives an easy curve when dragged. These brushes are mounted in quills, and are quite cheap. Keep brushes when not in use suspended in water or oil if they cannot be washed clean and dried.

Do all signs and notice-boards in clean Roman letters or simple derivatives. Avoid imitation solid or ‘ box ’ letters. They are difficult to do, and should be condemned as wholly artificial.

Gilding is not so difficult as would appear. Instead of with paint the letters are done in gold size, with a trace of colouring matter added—usually a yellow—to make plain the otherwise transparent forms. The board should have been well painted beforehand, and the surface made smooth with sand-paper.

Varnish on the top of gold leaf takes all the lustre out of it, and, if the board needs to be varnished, this should be done before the gold is applied.

Gold size can be made so that it dries slowly or quickly as required. Get your colourman to prepare it so that it becomes ‘ tacky ’ in about an hour. Paint the letters, using the size quite thinly, but make sure there are no parts missed. Test the size to see if it is ready by just touching with the tip of the finger as one tests the solution when repairing a puncture in a cycle-tyre.

Gold leaf is sold as ‘ transfer gold ’ in books of twenty-four sheets, these being of tissue paper with the gold adhering. The books are comparatively cheap.

Taking a sheet in the fingers, lay it face down on to the sized letter, and brush the back lightly with a small pad of cotton wool. Lift the tissue and the gold remains fixed to the size. Any loose pieces may be brushed off lightly with the pad.

The whole of the gold in the sheet will not have been used, and this remainder can be used for patching where necessary.

To prevent the leaf from adhering to any part of the surface other than the letters sign-writers dust the board with a little French chalk in a muslin ‘ pounce,’ or bag, before painting the letters. Good gold leaf will stand exposure to the weather without any protection.

CHAPTER XII

Stick-printing

Wooden Stick-dies

AN extension of the method used in printing dominoes (p. 126, Chapter IX) occurs in the making of wooden dies, wherein the boy's natural aptitude for whittling wood with a pocket-knife takes a practical turn.

The tools are few in number, and are familiar enough to be easily obtained. A few small files, round, half-round, triangular, and flat, and a few lengths of metal tubing about a foot long, in addition to pocket-knives, are the only tools needed for an average class or form. The files are more accurate in use than the usual pocket-knife of doubtful keenness, although the home-made stencil and block-cutting knives will be found to be particularly useful.

Simple patterns are worked on the ends of sticks of wood with the tools, these sticks being subsequently charged with colour if required, and impressed on paper or other material by hand-pressure. The dies can be also used for repetition-designs on plasticine or clay-models before firing and glazing, and for border-ornaments on school posters.

Used with water-colours mixed to a suitable consistency and rendered opaque by the addition of Chinese white where necessary, these dies are suitable for printing sample wallpapers and textile patterns, and for the decoration of end-papers, boxes, folders, books, and cardboard and paper work generally. These projects offer a wide field for ingenuity in pattern-forming and colour-combination through simple elements.

The dies can be executed by children when sitting at the desk. No special bench is necessary except where the designs have to be burned in with the metal tubes. In such cases a vice or similar holder is advisable, though not absolutely necessary. A Bunsen burner will also be needed.

Making the Dies

Small pieces of wood of square or rectangular section are cut to a length of from 2 in. to 5 in., whichever is found most convenient, the ends being made flat and square on a shooting-board or a wood-trimmer. The difficulty of making the ends fairly smooth and at right angles to the stick, without special appliances, is a real one. It can be done with a file and sandpaper, but only if the pieces are held in a vice, and even so it requires considerable practice and skill.

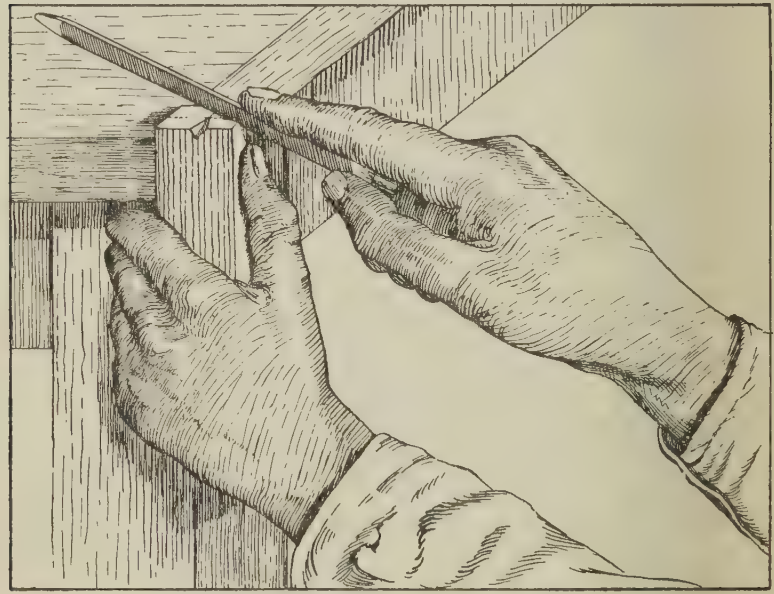


Fig. 145. Cutting the Die

If shot on a shooting-board, an appliance found in every woodwork room, it is best to do three or four at once, as the rear piece will have the far edge slightly splintered by the plane unless a waste piece is placed there. The task is rendered much easier if a fairly large piece, say 2 or 3 in. square in section, is made true at the ends and afterward sawn lengthwise into pieces of suitable width and thickness. The sides of the sticks may be planed subsequently. Another method is to shoot the end of a board which is afterward sawn into sticks and planed on the sawn edges.

The best wood for the purpose is beech, which is tough and close-grained. Since, however, it is difficult to obtain in the usual way, and rather expensive, we must accept any substitute which will serve. Mahogany, birch, maple, and whitewood, are all better than soft, open-grained woods such as pine and fir, but it is likely that the last-named will be the only ones available. If this is so, the worked ends of the sticks are improved if dipped once or twice in knotting or French polish, any surplus which interferes with the design being wiped off.

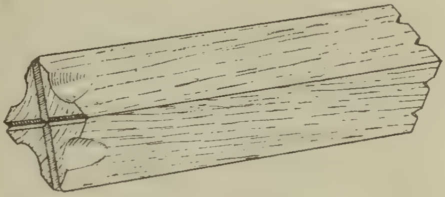


Fig. 146. A Finished Die

Dowel stick, also sold as curtain-rod, is admirable for circular dies, and is quite cheap. This round material is difficult to shoot on the ends without splintering, unless a very sharp plane is used. If this is found unsatisfactory the stick will have to be cut with a fine saw and filed smooth.

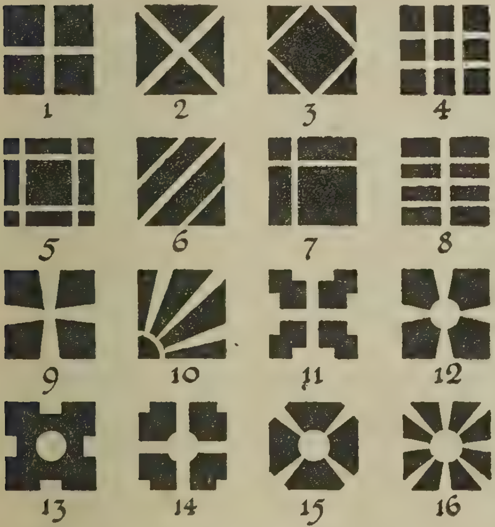


Fig. 147. Simple Units

Cutting the Die

On the prepared end of the stick the pattern is cut with file or knife, and as the depressions need be only quite shallow they offer no difficulty to children.

The stick is held in the left hand and pressed against the edge of the desk as shown in Fig. 145, the file or knife in the right hand being applied at the angle required for the design. Sticks of square or rectangular section should be used in the earlier exercises, but as the section of the wood contributes so largely to the design circular, rectangular, triangular, and polygonal sections should be introduced at later stages. The finished die is shown in Fig. 146.

The scope of design is very limited because of the primitive character of the process and appliances, but within these limitations there is considerable opportunity for ingenuity; indeed, the variations which are possible on a basic unit like the square are almost infinite. Examples of simple units are shown in Figs. 147, 148, and 149.

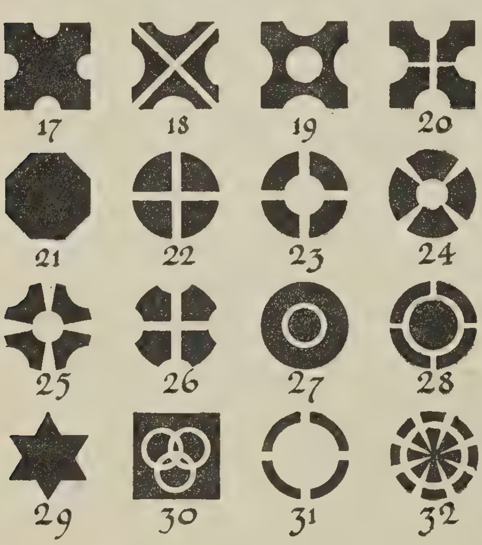


Fig. 148. Simple Units

The straight grooves in Nos. 1, 2, 3, etc., may be taken out with a sharp knife or a triangular file, as rough in cut as possible, and the curves in 17, 18, 19, etc., made with a few strokes of a half-round or round file of second cut. The tapering grooves in 9, 10, 12, etc., are easily accomplished with the file held obliquely to the face as shown in Fig. 145.

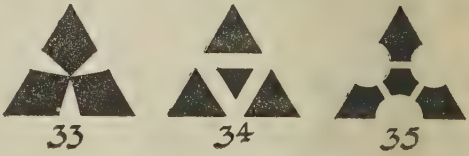


Fig. 149. Simple Units

A triangular file or the knife is needed for 29, and a square or flat file, or the flat side of the narrow half-round will make the depressions on the sides of 11 and 13.

The holes in 12, 13, 15, etc., may be bored with a brace and centre bit, or burned in with a piece of circular metal rod, while the circles in 27 and 28 will be burned with the metal tubing. The end of a lead pencil serves for a small circular dot, and if the lead be removed another unit is made.

Both ends of the stick may be cut.

When files are used on wood the teeth are liable to 'pin,' or become filled with the wood-dust, but they can be cleaned out quickly with a file card—a short brush of wire woven into strong fabric, readily obtainable from tool-dealers.

Stick-printing in Colours

Patterns of infinite variety of combination and colour can be built up from simple units, as shown in Figs. 150 and 151, and in Plate VI.

These are from examples printed with ordinary water-colours slightly thinned with water. The writer has found the best method to be to allow the units to suggest the design and not to prepare the design first.

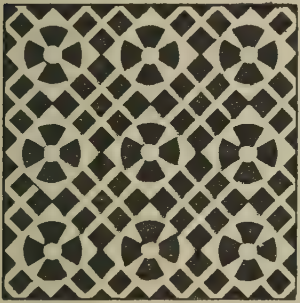


Fig. 150. Pattern built up from Simple Units

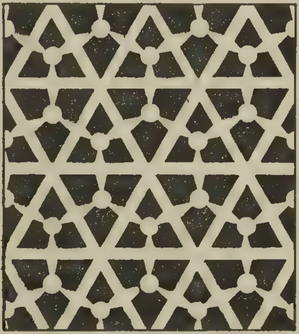


Fig. 151. Pattern built up from Simple Units

No special paper is necessary except in those designs where a toned background is used, and for these the common school pastel papers are quite suitable. Where white paper is needed use typewriting duplicating paper, and damp the sheets some time before use. The paper is absorbent, and the colour is taken into it, and softer effects are obtained than on hard paper.

The paper to be printed is laid upon a pad of blotting-paper. The colour may be picked up with the stick, in which case it needs to be spread on a piece of stout paper or card. Squeeze a small quantity from the tube, add a drop or two of water, and work the colour down from the heap to a thin layer. Press the stick lightly on this, and, on being lifted up, it will be found to hold enough colour to print clearly on the paper if applied without undue pressure. Allow one edge of the stamp to touch the paper first, and then rock it forward until the whole surface is flat on the paper. Should the edges not print clearly rock the stick a little on all four sides.

Sharper printing is obtained by applying the colour to the stick with a stencil brush, and this method also allows of blending two colours, or two tones, on the same stamp.

When, after trial prints, the pattern or combination of stamps and colours has been decided the paper may be ruled with fine pencil lines to ensure regularity.

A little practice is required to establish the right amount of colour needed on the die. Excess of colour will cause it to squeeze out when the die is pressed down and so cause a distorted pattern, while insufficient colour gives a feeble print.

Printing on Fabrics

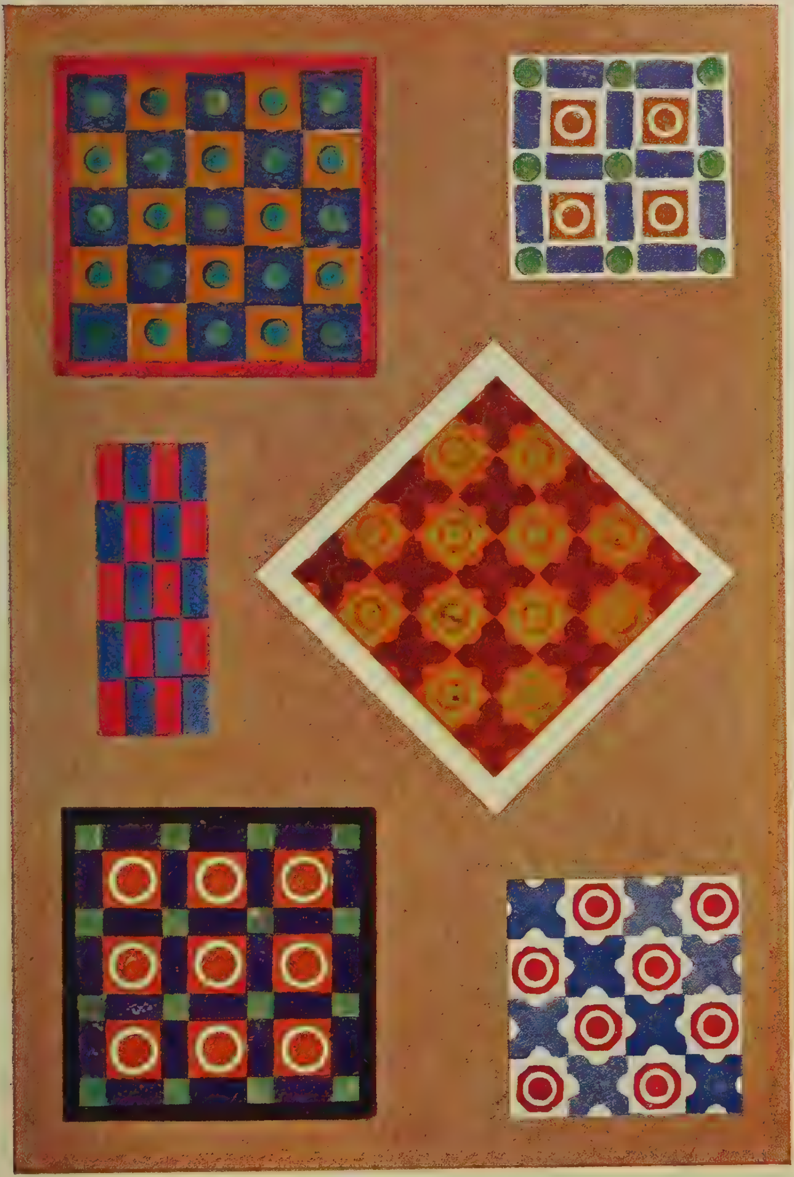
The dies may be used just as readily on cloth as on paper, but with oil-colours instead of water-colours. The colour is thinned with turpentine, to which may be added a few drops of acetic acid and oil of wintergreen. When dry the colours are permanent, and the material will stand careful washing, but not with hot water.

Liquid dyes would, no doubt, be more useful than oil-colours if they could be obtained, but, as far as the writer knows, these are not made in a form suitable for school use. Stencilling medium mixed with oil-colours will also serve to fix the colour on fabrics.

Other Methods

The production of dies on the ends of wooden sticks has an enhanced value by reason of the very simple tools and opera-

PLATE VI



Pupils' Typical Stick-print Designs built up from Simple Units

tions involved. The severest economy of design is imposed, and the range of variation is dominated by those operations.

From the previous chapters it will be obvious that more elaborate designs could be cut in linoleum and wood, and these, if affixed to sticks, could be used in the same manner. With these latter materials the field is extended widely, for there is practically no restriction in the matter of the design of the unit. Floral, geometrical, and simple pictorial units are easily made.

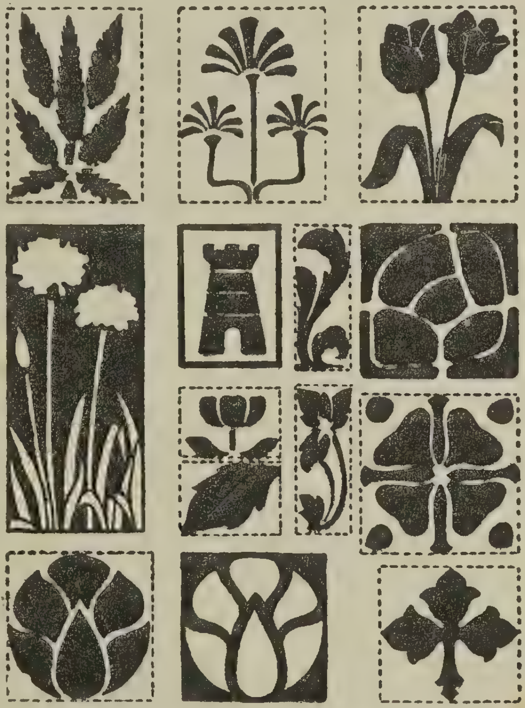


Fig. 152. Designs for Linoleum or Wooden Dies

The flat block is cut as described in Chapter IX, and a stick, the end section of which is exactly the same as the outer dimensions of the block, is trued to receive it. The end of the stick should be dipped in hot glue, or similar adhesive, to seal up the pores on the end of the grain. This glue should be allowed to set for some hours. If this is not done the lino will not adhere. Waterproof glue and elastic glue are most suitable in view of the subsequent dampness to which the die will be subjected.

At the time of uniting the block to the stick the glue must be hot, and pressure applied to squeeze out as much of it as is possible, care being taken that the face of the die is not injured. Surplus glue will be cleaned off after setting, and the die is ready for use as described above. Fig. 152 shows a number of designs which can be produced by this method. These are to be printed in colours, and most of them are more effective if printed on a coloured background.

The dotted lines round the designs indicate the actual size of the block, and therefore the end section of the stick to which it is attached. These designs are intended to be printed on alternate rectangles, or in some similar formal arrangement. If a design is required which will link up with itself and so make an all-over pattern it can be designed as suggested in Fig. 153, in which the repeats are shown by dotted lines.

When the block exceeds 1½ in. square it is better to dispense with the stick and mount the lino on a piece of wood of convenient thickness.

Metal Dies

For the decoration of woodwork models the writer has used a set of dies made on round or square sections of metal with files and drills, the patterns being similar to those in Figs. 147 and 148 and rectangles and squares of various sizes. These are heated and printed into the wood before cleaning up with the plane, which latter operation sharpens the impression.

The rod should be about a foot long, the upper end being pointed and fitted into a file-handle. When the hot die is being impressed on the material the lower end is guided by gripping with a pair of gas pliers held in the left hand. The die is not made red-hot, and the impression should be quite shallow.

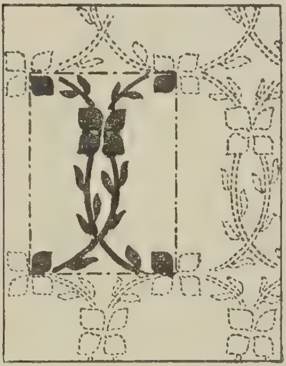


Fig. 153. A Repeat Pattern

For the ornamentation of leather, as in bookbinding, the dies are cut in brass, tubing being used for circles. These are heated to a low heat and impressed on the material.

A Scheme of Work in Book Crafts

FOR EQUIVALENT STANDARDS AND FORMS

STANDARDS 1 AND 2. PREPARATORY FORMS I AND II

Printing dominoes with the end of a pencil. Simple book-making. Folding of pages and cutting with paper-knife. Sewing a simple book for notes. Script writing. Roman line capitals.

STANDARD 3. PREPARATORY FORM II

Further exercises in book-making. Measuring the pieces for the paper and cutting with scissors. Making a note-book and case. Greeting cards. Pastel books. Decoration of covers by simple punched stencils and dies (stick-printing). Script writing with simple pen ornament.

STANDARD 4. PREPARATORY FORM III

Class and exercise books to be made as required. Stencilling. Patterns made up from simple units—rectangles, punched circles, etc. Stencils to be cut with knives. Script writing with medium broad pens. The arrangement of poetry and prose with plain Roman initial letters. Stick-printing.

STANDARD 5. FORM I

Book sewing on tapes. Soft covers. Pupils' own exercise books sewn and bound into a volume. Making a portfolio for loose drawings. Writing with broad pens in two colours. Stencilling in colour. Making a stencil knife. Making sewing frame. Simple lino-block cutting and printing. Stick-printing. Stick-printing on plastic material or clay.

Printing and Book Crafts

STANDARD 6. FORM II

Letterpress printing. Make a lever press and accessories. Bookbinding in cases. Autograph and postcard albums. Manuscript writing. The making of cane pens. Rhyme-sheets with stencilled decorations. Lino-block printing in colours. Making a lino cutting knife. Book-labels in colour.

STANDARD 7. FORM III

Making a toggle press. The school magazine and school printing. Illustration. Lino and woodcuts, engravings, stencils, and zinc etching. Book-plates. Manuscript writing—versals, Gothic letters. Illuminating, gilding with shell gold. Study of manuscripts. Reading of *The Stones of Venice*, vol. ii. Design and cutting of initial letters. School posters. Sign-writing and gilding.

GLOSSARY

Ampersand. The abbreviation for ‘ and ’—&.

Antique. A term used to describe papers with a rough surface. Also the name of a type-face (thus, **antique**).

Arabic Figures. Ordinary numerals, such as 3, 6, 9, as distinct from Roman numerals, as III, VI, IX.

Art Paper. A clay-surfaced paper, smooth and polished, used for half-tone reproduction.

Ascending Letters. All letters with up-strokes, as *b*, *d*, *f*, *k*, *h*, *l*.

Bad Colour. Too much or too little ink used; also uneven distribution.

Bank Paper. A thin, tough paper.

Barge. A small case or box for storing supplies of spaces. Used when making alterations in justification.

Battered Type. Type broken or damaged through wear, accident, or carelessness.

Beat. To get good colour to a solid part of a forme, as a woodcut, it is beaten with roller or ball.

Bed. The table of a press on which the forme lies.

Bind. If the furniture is longer or wider than the type when locking up it is said to bind, and the type cannot be sufficiently tightened.

Black-letter. Old English type (𝔅𝔩𝔞𝔠𝔨-𝔩𝔢𝔱𝔱𝔢𝔯).

Blacks. When a space, quad, or furniture rises and prints on the sheet. They also occur when blocks are not cleaned out deeply enough.

Block, or Cut. A term covering line blocks, half-tone blocks, woodcuts, etc.

Body. The solid column of metal on the end of which is the raised letter. See Fig. 31.

Braces: ⏞. These are cast on their own bodies and by degrees of ems.

Brass Rule, or Rule. Strips of metal of type-height used for printing lines, and obtainable in many thicknesses from 1-point ($\frac{1}{72}$ in.) to 18-point ($\frac{1}{4}$ in.).

Brayer. A flat, wooden spade for spreading ink on the inking or brayer table.

Bring up. To make ready or to level the type by overlaying or patching up.

Broadside. A sheet printed on one side only, as a poster in letterpress.

Calendered Paper. Paper with a highly rolled and glazed surface —*i.e.*, art paper.

Caps. Abbreviation of ‘capitals,’ and indicated in a manuscript by three lines underneath the letters to be so printed.

Caps and Smalls. A word set up in capitals, the initial being a full capital, the rest small capitals—thus, Printing. Indicated by three and two underlinings in the copy.

Case. A cover made separately from a book.

Chase. The frame which holds the type while in the press.

Choked. Type clogged with ink through improper cleaning.

Circles. Brass circles cast hollow to allow of type being inserted.

Corner. An ornament used for decorating the corner of a border of rule or type-border.

Dele. Delete; shown by a sign thus, δ or ₰.

Descending Letters. Letters with down-strokes, as *q*, *p*, *y*.

Display. The opposite of ‘straight setting.’ The arrangement of type as in advertising.

Distribute, or ‘Dis.’ To replace type into cases.

Double Cases. Type-cases combining upper and lower cases in one.

Drag. When a print is slurred on the type.

Draw. When the letters are pulled out during inking.

Egyptian. A type-face in which the letters are heavy in design **(Egyptian).**

Eight-to-pica Leads. Leads cast eight to a pica; also called thin leads; 1½-point, new style.

Electros. Blocks produced by a galvanic deposit of copper, which is afterward filled in with metal and mounted to type-height.

Em. Printers' general measure. Pica is taken as the standard for measurement, and the pica em = $\frac{1}{6}$ in.

Em Quad. A small square space equal to an em of a particular body.

En. Half an em.

Etching. An engraving on copper (or zinc), the picture being cut through a thin layer of acid-resisting material with a needle. The plate is immersed in acid, which bites into the unprotected portions. In a mechanical process the term is used for the action of the acid.

Fancy Rule. Brass rule obtainable in various designs.

Foot-stick. A wedge-shaped piece of furniture placed at the foot of the type.

Forme. A page or pages of type in the chase is called the forme.

Fount. A full set of types. Caslon Old Face, Cochin, Garamond, Decoy, Kennerley, Baskerville, Forum, Narcissus, etc., are different founts of type. The name signifies a distinct design, no matter what the size.

Full Face. A letter without a beard—a titling letter.

Full-point. Full-stop.

Furniture. The parallel pieces of hardwood surrounding the type in the chase. Metal furniture is sometimes used, the latest being of aluminium.

Fractions. Sometimes cast in one piece and called a whole, or in halves and termed split.

Friar, or Frier. A light patch in a printed sheet.

Frisket. A light frame folding over the platen, and having a sheet pasted to it. Parts to be printed are cut out of the sheet, the remainder protecting the sheet during printing.

Galley. A wood or metal receptacle for holding matter before it is made into pages.

Galley Proof. A rough proof of the matter taken from the type in the galley before making up.

Head. The margin at the top of a page.

Imposing Stone. Flat stone or iron surface on which formes are imposed, corrected, and locked up. Also called imposing surface or table.

Imposition. Arrangement of the pages in the chase so that they will fold in proper sequence and register correctly.

Indent. To throw a line in, as the opening line of a paragraph.

Inking Ball. The old pelt ball used in inking the type before rollers were invented.

Intaglio. Printing from a cut plate, as copperplate. The reverse of relief or letterpress printing. (Pronounced *intahlio.*)

Jobbing Founts. Types of fancy character.

Justification. Applied to the even and equal spacing of words and lines to a given length.

Kerned Letter. The kern is the overhanging part of a letter in some founts, especially italics and script.

Laid Paper. Paper which shows parallel markings from the wire tray or roller used in manufacture.

Lay-out. A rough design for a piece of printed matter.

Lead out. To spread out the type lines by means of leads.

Leads. Metal strips of various thicknesses, less than type-height, to separate the lines of type. (Pronounced *leds.*)

Leaders. Dots or full-points cast on an em, thus ... (Pronounced *leeders.*)

Letterpress. Printing from type as distinct from lithographic or plate-printing.

Ligatures. Two or more letters cast in one piece, as *ct* or *ffi.*

Linotype. A type-setting machine which casts the type in a ‘ slug ’ or line (‘ line o’ type ’). Operated by a keyboard similar to a typewriter.

Lithograph. A process of printing, originally from the surface of a fine-grained stone which has the property of absorbing grease, but not water. Zinc and aluminium are now used instead of the stone.

Lock up. To fasten up the matter in a forme by tightening the quoins with a mallet and shooting-stick.

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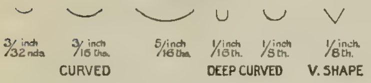

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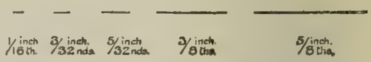

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2 in. ,, ...	,, 2/–
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Low to Paper. Worn type—*i.e.*, lower than new type.

Lye. The liquid used for cleaning type.

Make-up. The arrangement or lay-out of a page or book.

Measure. The width of a page of type. Printers calculate in pica ems.

Mezzotint. A process of printing from a copper plate, the surface of which has been roughened by pitting with a 'rocker,' a tool with a serrated edge. The picture is produced on the plate by smoothing certain portions with a burnisher. The plate is inked all over, and when wiped the ink remains in the roughened parts and is transferred to the paper by rolling under pressure.

Middle Spaces. Spaces cast four to an em of any particular body.

Monk. A black patch on a print due to bad ink or careless rolling up.

Monotype. A type-setting machine comprising a separate keyboard and casting outfit. The type is cast in separate characters by mechanism operated by a punched paper roll produced on the keyboard. After use the type is returned to the melting-pot instead of being distributed.

Off its Feet. Type which is not standing squarely.

Offset. The transfer of ink from one sheet to another while wet. Also a modern printing process wherein the ink or colour is transferred from the plate, forme, or stone to the paper *via* a rubber roller.

Overlay. To make ready by overlaying—the reverse of underlaying.

Oxford Corners. Borders with overlapping corners (thus, +).

Peculiars. Little-used signs, accents, etc., for which there is no place in the type-cases.

Pica. The old name of size of type equal to 12-point. A printers' standard of measurement, there being six pica ems to one inch.

Pie. The indiscriminate mixing of type, involving the weary task of separating and distributing it.

Platen. Machines which have a flat impression—not a cylindrical one. (Pronounced *platten.*)

Point. The unit of modern type measurement. A point is $\frac{1}{72}$ in.

Process Blocks. The thin metal plates, mounted usually on wood to type-height, by means of which illustrations are reproduced by the letterpress-printing process.

Quadrats (' Quads '). Large metal blanks, of less than type-height, used for filling out short lines of type to the correct length.

Quoins. Small wedges of wood or metal used for tightening up the formes. (Pronounced *coins.*)

Reference Marks. Signs to indicate notes, such as *, †, ‡, §, ‖, ¶.

Register. To print exactly in the correct place.

Reglet. Thin wooden furniture in 6, 8, 10, 12, and 18-point thicknesses. Sold in 36-in. lengths.

Rise. The forme is said to rise when it springs through careless locking up and the type is forced off its feet.

Rollers. Ink rollers are made from various compositions, with treacle and glue as the main constituents. The rollers are washed in lye after use, and hung from a hook.

Rubricated Letters. Capitals in red ink.

Serif. The fine lines at the top and bottom of a letter, as in this : H. Hence sans-serif, type without serifs.

Side-stick. *See* Foot-stick.

Solid Matter. Type set up without leads between the lines.

Stereotype. A replica which has been cast from a mould taken in *papier-maché* (' flong ') from the surface of the type.

Stipple. Shading by dots as distinct from lines.

Swash Letters. Italic capitals with tails and flourishes—for example, *A*, *M*, *N*.

Tailpiece. An ornament or design at the foot of a page.

Thick Spaces. Spaces cast three to an em of their own particular body.

Thin Spaces. Spaces cast five to an em of their own body.

Turned Sorts. If the supply of a particular letter runs out another of the same size is set inverted temporarily.

Type Metal. A composition of lead, tin, and antimony, sometimes with other alloys. The mixture varies slightly according to the character of the fount being cast, and also with the typefounder's experience. A baser composition is used for leads and quadrats.

UNDERLAY. To make ready by packing *under* the types.

WOOD-LETTER. Large types for poster-work are cut on wood. A recent process makes them in aluminium.

WOVE PAPER. Paper showing no wire- or roller-marks.

ZINCOGRAPHY. The reproduction of illustrations by mechanical means on zinc plates. The medium between the original and the plate is photography, and the design is etched out in an acid bath.

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